

**RELATIONSHIP BETWEEN DURATION OF KAMEKO CONSUMPTION  
(AREN FERMENTATION BEVERAGE) TO HEMATOLOGY LEVELS IN  
LABAHA VILLAGE, KECAMATAN WATOPUTE, MUNA DISTRICT,  
SOUTHEAST SULAWESI**

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**Abstract**

Aren (Arengapinnata) is a type of coconut palm which is one of the plants that can produce a type of traditional alcoholic beverage and has 4% alcohol content. Consumption of too much alcohol can cause anemia by affecting the process of blood formation (hematopoiesis) through metabolic and nutritional effects and also directly inhibits the proliferation of all cellular elements in the bone marrow. The purpose of this study was to determine the relationship of the duration of kameko consumption to hematological levels in Labaha Village, WatoputeSubdistrict, Muna Regency in 2018. This study is an observational analytical study with a cross sectional study design. The results showed that of the 25 respondents, the cross tabulation test showed, for the duration of consumption with hematological levels  $\leq 5$  years with a total of 17

respondents obtained abnormal examination scores for Hemoglobin levels (58.8%), Erythrocytes (41.2%), and Leukocytes (41.2%). While consumption of kameko > 5 years with a total of 8 respondents, abnormal hematological levels were obtained. While the spearman correlation test between the duration of consumption and the three parameters of Hemoglobin test, Erythrocyte and Leukocyte obtained sig.  $p < 0.05$  with correlation strength of each value  $r = -0.953$ ,  $r = -0.934$ ,  $r = 0.82$ . The conclusion of this study is that there is a correlation between the duration of consumption to hematological levels (Hemoglobin, Leukocytes and Erythrocytes) with Kameko consumption in Labaha Village, Watopute District, Muna Regency in 2018.

**Keywords: Kameko, duration of consumption, hematology levels, hemoglobin**

## **Introduction**

Liquor has long been known in the community and has become a common problem throughout the world. WHO (2015) stated that as many as 61, 7% of the population worldwide have been drinking alcohol for more than 12 months which causes around 3.3 million deaths or 5.9% of all deaths worldwide.<sup>1</sup>

Alcohol consumption has also become a habit in Indonesia. WHO in 2011 recorded at least 4.3% of students and 0.8% of students had consumed alcohol.<sup>2</sup> Based on Riskesdes data in 2007, it was found that in Indonesia, the prevalence of alcohol drinkers reached 4.6%. Alcohol drinkers start at the age between 15-24 years that is equal to 5.5%, which then increases to 6.7% at the age of 25-34 years, but then decreases with increasing age.<sup>3</sup>

Traditional alcoholic drinks are one type of beverage that is rife in several regions in Indonesia. Traditional alcoholic drinks are made and packaged in a simple way and are

often used as a feast at traditional events, such as Cap Tikus drinks from Manado and Minahasa, Ballo from Makassar, Sopi from Maluku and surrounding areas, Lapen from Yogyakarta, Arak Bali and others.<sup>4</sup>

Enau or palm sugar (*Arengapinnata*, *Arecaceae* tribe) is a type of coconut palm (*nyiur*) because it is a versatile plant. Utilization of palm trees in the province of Southeast Sulawesi, especially in Muna Regency is by processing these plants into raw materials that have high economic value. Some food ingredients made from processed palm sugar in the form of palm sugar, vinegar, and alcoholic beverages such as kameko / tuak.<sup>5</sup>

Based on Presidential Decree No.3 of 2007 concerning supervision and control of alcohol divided into 3 groups: Group A: ethanol level 1 - 5%; Group B: ethanol level 5 - 20%; Group C: ethanol levels 20 - 55%. Quoted from Wikipedia sources, 2017 palm water fermented has 4% alcohol content and includes alcoholic group A drinks. And the beverage is a class of alcoholic beverages that can be intoxicating.<sup>5</sup>

One cause of anemia is too much alcohol consumption. Chronic alcoholics are very easy to suffer from gastritis and are very sensitive to the loss of protein and blood plasma while drinking alcohol. Alcohol reversibly can damage the intestines, cause diarrhea, and lose weight and deficiency of various vitamins. Alcohol indirectly affects hematopoiesis through metabolic and nutritional effects it may also directly inhibit the proliferation of all cellular elements in the bone marrow. Hematological disorder seen in chronic drinkers is mild anemia caused by folic acid deficiency alcohol-related. Iron deficiency anemia may be caused by gastrointestinal bleeding. Alcohol can also be a cause of several hemolytic syndromes, some of which are related to hyperlipidemia and severe liver disease.<sup>6</sup>

Kameko is a fermented drink made from palm tree water. The characteristics of kameko are sweet and yellow. Consumption of kameko is a custom of the community, especially in the village of Labaha, WatoputeSubdistrict, Muna Regency. Consuming excessive amounts of kameko and frequent drinking can cause hangovers and addiction. The reasons local people consume kameko are consuming kameko can increase spirit of work so that work is faster resolved.

Based on a study conducted by Dedy (2012) by using 20 samples of alcoholic / tuak addicts in SukariaSubdistrict, PanakkukangSubdistrict, it was found that 14 samples (70%) of alcoholic / tuak addicts experienced a decrease in hemoglobin levels from normal levels. Alcohol can interfere with the absorption of vitamin B12 in the intestine while the function of B12 functions in the process of forming red blood cells. And alcohol can cause damage to the structure of the production site of blood cells.<sup>7</sup>

Based on this matter, it is necessary to do research on the relationship between the duration of kameko consumption to hematological levels in Labaha Village, WatoputeSubdistrict, Muna Regency in 2018.

### **Research Materials and Methods**

This study is an Analytical Observational study with a Cross sectional study design to determine the effect of Kameko consumption to hematological levels (Hemoglobin, Erythrocytes and Leukocytes). The population of this study was 27 people consuming Kameko in Labaha Village, WatoputeSubdistrict with a sample size of 25 people and male sex based on the prevalence of male alcohol drinkers in Indonesia higher than female.

## 1. **Taking blood samples**

Doing blood sampling is done by the phlebotomy technique and using the K3 EDTA tube, then attaching cuffs / damming rubber to the upper arm about 4 fingers (7-10 cm) above the fossa cubiti. Inserting the needle into the vein, until the sign of the entry of the blood sample in the needle appears which can be seen on the spout. Blood samples are immediately transferred to the tube and homogenized.<sup>8</sup>

## 2. **Hematology examination with Hematology Analyzer**

Homogenized the sample that has been taken, pressing the Whole Blood button "WB" on the monitor screen, pressing the ID button and entering the sample to be used, then press enter. Press the top of the sample place and place the sample into the adapter. Close the sample place properly then press "RUN". The results will automatically appear on the screen. Record the results of the examination.<sup>9</sup>

## **Results**

### 1. Level of Hematology

Hematological levels examined included hemoglobin levels, erythrocyte levels, leukocyte levels. Description of hematological levels if categorized based on the normal reference value, can be seen in each category in Table 1.

**Table 1. Overview of the Results of the Hematology Level Examination based on the Category of Normal Levels Reference in Labaha Village, Watopute District, 2018.**

Hematology Level Category	n	%
Hb level(< 13,3-16,2 mg/dl)		
Low	18	72,0
Normal	7	28,0
Erythrocyte level (<4,0-5,2 x10 <sup>6</sup> /mm <sup>3</sup> )		
Low	15	60,0
Normal	10	40,0
Leukocyte Levels (>4000-10000/mm <sup>3</sup> )		
High	15	60,0
Normal	10	40,0
<b>Total</b>	<b>25</b>	<b>100,0</b>

Source : Primary Data, 2018

Table 1.above shows that, of the 25 people consuming Kameko, 18 people (72%) obtained the results of the examination of hemoglobin levels in the low category. In addition, erythrocyte levels were 15 people (60%) with low erythrocyte levels. The frequency is the same as the high category leukocyte level.

## 2. The Duration of Kameko Consumption

The results of data collection found that the length of duration the respondents consumed kameko varied greatly. The duration period ranges from 4 months to 9 years. This shows that there are respondents who are new drinkers and there are also long-term drinkers. Length of duration consumption of kameko if categorized into 2 categories which are under 5 years and over 5 years, it can be seen in Table 2.

**Table 2. Amount of Proportion of Kameko Consumption Duration based on Duration Category in Labaha Village Watopute District in 2018.**

<b>Kameko Consumption Duration</b>	<b>n</b>	<b>%</b>
≤ 5 tahun	17	68,0
>5 tahun	8	32,0
<b>Total</b>	<b>25</b>	<b>100,0</b>

*Source: Primary Data, 2018*

Table 2 shows that most (68%) of the 25 respondents consumed kameko for less than 5 years whereas more than 5 years is 32%.

### 3. Regression Test of Simple Linear

The results of a regression test of simple linear can be seen in Table 3.

**Table 3. Table of Results of Regression Analysis of Simple Linear between Duration of Kameko Consumption to Hematology Level in Labaha Village, Watopute District, Muna Regency in 2018.**

	<b>Consumption Duration</b>
<b>Hemoglobin Level</b>	R square = 0,915
	$p < 0,05$
	B = -0.62
<b>Erythrocytes Level</b>	R square = 0,751
	$p < 0,05$
	B = -0,24
<b>Leukocytes Level</b>	R square = 0,462
	$p < 0,05$
	B = 0,29

*Source: Primary Data 2018*

## Test Results of Simple Linear Regression

### a. Consumption duration to hemoglobin levels

In the output of "Model Summary", it is obtained information on the size of the contribution of consumption duration to hemoglobin levels. Obtained the adjusted R square value = 0.915. This means, the consumption duration contributes to the hemoglobin level of 91.5%. This figure means that 91.5% of hemoglobin levels can be explained by the length of consumption of kameko, while the remaining 8.5% must be explained by other factors. In the "ANOVA" output, it is obtained the sig value information. = 0,000 <0,05 that means Ho = rejected and Ha = accepted. This shows that there is a relationship between the duration of consumption of kameko to hemoglobin levels.

In the output of "coefficients", it is obtained the coefficient number information for the regression formula. Because the value of  $p = 0,000 < 0,05$  then the coefficient can be used in the formula. Thus the regression formula is:  
**Hemoglobin levels = 14.50 + (-0.62) \* consumption duration.**

### b. Consumption duration to erythrocyte levels

In the output of "Model Summary", it is obtained the information on the size of the contribution of the consumption duration to erythrocyte levels. Obtained adjusted R square value = 0.751. This means, the duration of consumption contributes to erythrocyte levels of 75.1%. This figure means that 75.1% of erythrocyte levels can be explained by the duration of kameko consumption, while the rest, 24.9% must be explained by other factors. In the "ANOVA"

output, it is obtained the sig value information. = 0,000 <0,05, that means Ho = rejected and Ha = accepted. This shows that there is a relationship between the duration of kameko consumption to erythrocyte levels.

In the output of "coefficients", it is obtained the coefficient number information for the regression formula. Because the value of p = 0,000 <0,05 then the coefficient can be used in the formula. Thus the regression formula is:

$$\text{Erythrocyte level} = 5.354 + (- 0.24) * \text{consumption duration}$$

c. Consumption duration to leukocyte levels

In the output of the "Model Summary", it is obtained information on the amount of contribution of consumption duration to leukocyte levels. Obtained the adjusted R square value = 0.462. This means, the consumption duration contributes to leukocyte levels by 46.2%. This figure means that 46.2% of leukocyte levels can be explained by the duration of kameko consumption while the remaining 53.8% must be explained by other factors.

In the output "ANOVA", we get the sig. value information = 0,000 <0,05, that means Ho = rejected and Ha = accepted. This shows that there is a relationship between the duration of kameko consumption to leukocyte levels.

In the output of "coefficients", it is obtained the coefficient number information for the regression formula. Because the value of p = 0,000 <0,05 then the coefficient can be used in the formula. Thus the regression formula is:

$$\text{Leukocyte level} = 9.22 + 0.29 * \text{consumption duration}$$

## **Discussion**

Table 1.above shows that, of the 25 people consuming Kameko, 18 people (72%) obtained the results of the examination of hemoglobin levels in the low category. In addition, erythrocyte levels were 15 people (60%) with low erythrocyte levels. The frequency is the same as the high category leukocyte level. This shows that only a small percentage of respondents whose hematological levels are in the normal category. This is in accordance with Dedi's (2012) theory which stated that alcohol can affect the decrease of hemoglobin levels in the blood. With the research title Hemoglobin Level Study in Tuak Addicts. The results of the study showed that abnormal hemoglobin levels were 14 people (70%) and normal as many as 6 people (30%).

While for erythrocyte levels in alcohol consumption, reductions in erythrocyte levels were found with a greater number of respondents, 15 respondents (60%) than normal with 10 respondents (40%). This is because the fermented kameko contains higher alcohol content by adding mangrove bark which functions to change the taste and color, while it is known that alcohol can interfere with the hemopoiesis process in the bone marrow as a place for producing red blood cells. Research by Harold S. Ballard, M.Dd (1997) New York with the title of Hematology Complications from alcoholics, with the results of research on alcohol consumption can cause suppression of blood cell production and abnormal structures producing blood cells that cannot produce adult blood cells that match their function.<sup>10</sup>

For leukocyte levels found a level increase than normal values as many as 15 respondents (60%) higher than normal leukocyte levels with the number of 10

respondents (40%). This is because alcohol consumption can reduce a person's immune system so that it is susceptible to infection. An increase in the number of leukocytes in the body can indicate someone is being infected so that the body's defense component in this case leukocytes will be active to fight existing infections.

In addition, the alcohol content in kameko which is consumed in excess will be difficult to neutralize by the liver so that it can cause damage or infection to the liver. Research by Danastri, CN (2013) Faculty of Medicine, University of Lampung with the title of research on Hepatitis Cirrhosis in Patients with Chronic Alcohol Consumption History, with the results of consuming alcohol for a long time can interfere with liver function so that it can increase leukocyte levels in the blood marked by infection.<sup>11</sup>

From the Tabel 3. Test Results of Simple Linear Regression we get a relationship between the duration of kameko consumption to hemoglobin level  $B = -0.62$  which shows that the results of examination of hemoglobin levels are negatively correlated, which means that the longer duration of kameko consumption, the hemoglobin level will decrease. Furthermore we get a relationship between the duration of kameko consumption to the hemoglobin level  $B = -0.024$  which shows that the results of the examination of erythrocyte levels are negatively correlated, which means that the longer the duration of kameko consumption, the erythrocyte levels will decline. And also we get a relationship between the duration of kameko consumption to the hemoglobin level  $B = -0.020$  which shows that the results of the examination of erythrocyte levels are positively correlated, which means that the longer consumption of kameko, the erythrocyte level will experience an increase.

## **Conclusion**

Based on the research, it is concluded that there is a correlation between the duration of consumption to hematological levels (Hb, Leukocytes and Erythrocytes) with Kameko consumption in Labaha Village, Kec. WatoputeKab.Muna 2018 indicated by the value sig.  $<0.05$  for all inspection parameters.

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