

# The Effect Of Drinking Calcareous Water On The Image Of Renal Function And Calcium In Kesan Eastern Mountain Residents, Ketapang Madura

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**The Effect Of Drinking Calcareous Water On The Image Of Renal Function And Calcium In Kesan Eastern Mountain Residents, Ketapang Madura****Rahma Widyastuti<sup>1(CA)</sup>, Ellies Tunjung S.M<sup>2</sup>, Nur Vita Purwaningsih<sup>3</sup>**<sup>1(CA)</sup> Department of Medical Laboratory Technology, Muhammadiyah University of Surabaya, Indonesia;blue4rahma@gmail.com (Corresponding Author)<sup>2</sup> Department of Medical Laboratory Technology, Muhammadiyah University of Surabaya, Indonesia; elliestunjungismail@gmail.com<sup>3</sup> Department of Medical Laboratory Technology, Muhammadiyah University of Surabaya, Indonesia;vitasagi86@gmail.com**ABSTRACT**

According to observations made in the hamlet of Gunung Kesan Timur, Paopale Laok Village, Ketapang, Sampang, Madura, locals in general continue to use well water. People drink calcareous well water without first filtering it. It can be seen in the well water container that the water includes lime, which results in a white crust. Objective: The goal of this research was to find out how residents in the Gunung Ketapang Madura sub-village described their renal function and calcium levels. Methods: The type of research used was descriptive research, The villagers of Gunung Kesan Timur Hamlet, Paopale Laok Village, Ketapang District, Sampang Madura, who drank calcareous well water were the subjects of this study. The samples were gathered from up to 30 people utilizing observational and questionnaire sampling approaches. Result : The creatinine results from 30 samples revealed that 25 (83%) samples had normal creatinine levels and 5 (17%) samples had abnormal creatinine levels, while the BUN results for 30 samples were declared to be 100percent normal, and the calcium results revealed that 13 samples (43%) were declared abnormal and 17 samples (57%) were declared normal. High creatinine and calcium levels have consequences.

**Keywords:** Calcium; Calcareous Water; Renal Function**INTRODUCTION**

Water is a critical need for people, whether directly or indirectly. Water is an absolute necessity for survival. Humans cannot survive for lengthy periods of time without drinking water. Meanwhile, water that is directly drunk has certain needs, particularly in terms of health. Humans can identify the type and amount of clean water that is helpful for daily life in order to meet water needs, because if both quality and quantity are not met, it can have a negative influence on socioeconomic health (Munfiah and Setiani, 2015)

Water is a basic need for humans with all kinds of activities which can be used for purposes household activities such as drinking, bathing and other. so effort is needed supply of clean water that meets clean water quality requirements (Yunus, 2016). Where it is set in Regulation of the Minister of Health of the Republic of Indonesia No.416/Menkes/Per/XI/1990, regarding quality clean water in hilly areas or in the limestone mountain area causes condition of polluted clean water sources especially in the dug wells around. Limestone mountains contain lime, thus causing the water to become hard. Parameters used for measuring the low quality of ground water caused by rock structure and the type of soil, one of which is hardness, maximum level of hardness which is regulated in the Permenkes, namely in above 500 mg/L. Water usage excessive or repeated pain can have a detrimental impact for the body, one of which is disease kidney stones (Astrini, 2016).

Water containing lime or having a high hardness level might induce renal difficulties over time due to the formation of CaCO<sub>3</sub> (Krisna, 2011). Creatinine levels, urea levels, or BUN (Blood Urea Nitrogen), and creatinine clients are all common tests for renal function. Creatinine is an endogenous metabolic product that can be used to evaluate glomerular function. Urea is a nitrogen compound secreted by the kidneys as a result of protein and food. Every day, the same quantity of creatinine is created and eliminated in the urine (Saputri *et al.*, 2019). DEPKES RI states that the maximum calcium content in drinking water is 75 mg / liter of drinking water and there is no minimum requirement. Water quality requirements as one of the chemical parameters, namely the amount of mineral content such as calcium and magnesium. Consuming drinking water with a mineral composition in water that contains a lot of calcium ions is thought to cause hyperexcretion of calcium and affect health (Umboh, 2016). Calcium ions are really needed in the body, generally calcium levels in the blood must be carefully controlled. In a day consumption of calcium should not exceed 2500 mg. Hypercalcemia is a condition caused by excessive levels of calcium in the blood. In this situation, the serum calcium level is >10.4 mg/dl (Hidayat, *et al.*, 2017). Dusun Gunung Kesan Timur, Paopale Laok is a village located in Ketapang District,

Sampang Regency, Madura, East Java Province, Indonesia. Based on its geology, Sampang Regency consists of several types of rock, one of which is limestone (chalk). Observations made in the Dusun Gunung Kesan Timur, Paopale Laok Village, Ketapang, Sampang, Madura, it was found that the villagers generally still use well water as a source of clean water for household purposes, both for washing, bathing, and even being consumed as drinking water. It has become a habit every day, the people consume calcareous well water without being processed first. It can be seen from the well water reservoir that causes a white crust which is a feature or sign that the water contains lime. Based on the above background, the research on the habit of consuming calcareous well water on the description of kidney function and calcium levels in the people of Dusun Gunung Kesan Timur, Ketapang Madura, especially in the village of Paopale Laok. The results of the study are expected to provide information to the public about drinking water containing lime for health.

#### METHODS

The type of research used was descriptive research, which is research that aims to observe and explain a situation or occurrence, in this case, the effects of drinking calcareous well water on kidney function and calcium levels in the people of Dusun Gunung Kesan Timur, Paopale Laok Village, Sampang Madura. The inhabitants of Dusun Gunung Kesan Timur, Paopale Laok Village, Ketapang District, Sampang Madura, who drank calcareous well water were the subjects of this study. The samples were gathered from up to 30 people utilizing observational and questionnaire sampling approaches.

#### RESULTS

##### Results of Creatinine Levels in People Consuming Calcareous Water

Tabel 1. Percentage of Creatinine Levels in People Consuming Calcareous Water in Dusun Gunung Kesan Timur

Area	Frequency	Percentage
Normal	25	83
Abnormal	5	17
Total	30	100

According to table 1, the results of creatinine levels in 30 samples showed that 25 persons (83%) had normal creatinine levels and 5 people (17%) had abnormal creatinine levels.

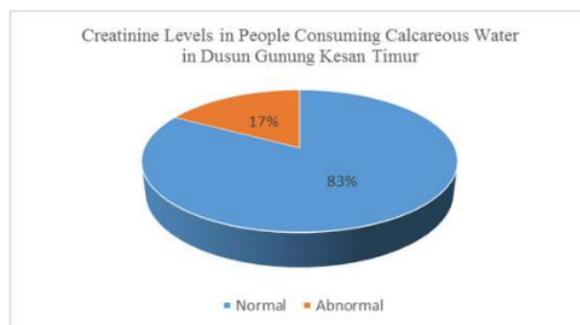


Figure 1. Creatinine Levels in People Consuming Calcareous Water in Dusun Gunung Kesan Timur

##### Results of Creatinine Levels in People Consuming Calcareous Water

Table 2. Percentage of BUN Levels in People Consuming Calcareous Water in Dusun Gunung Kesan Timur

Area	Frequency	Percentage
Normal	30	100
Abnormal	0	0
Total	30	100

According to table 2, the results of BUN levels in 30 samples showed that 30 persons (100%) had normal BUN levels.

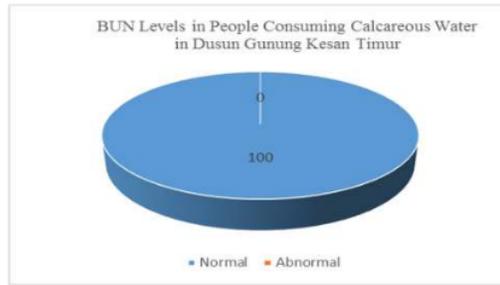


Figure 2. BUN Levels in People Consuming Calcareous Water in Dusun Gunung Kesan Timur

**Results of Calcium Levels in People Consuming Calcareous Water**

Table 3. Percentage of Calcium Levels in People Consuming Calcareous Water in Dusun Gunung Kesan Timur

Area	Frequency	Percentage
Normal	17	57
Abnormal	13	33
Total	30	100

According to table 3, the results of calcium levels in 30 samples showed that 17 persons (57%) had normal calcium levels and 13 people (33%) had abnormal calcium levels.

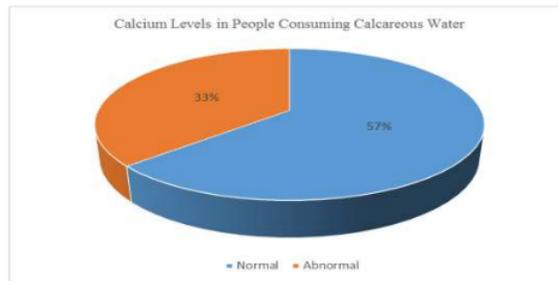


Figure 3. Calcium Levels in People Consuming Calcareous Water in Dusun Gunung Kesan Timur

**Analysis of Creatinin, BUN and Calcium Based on gender**

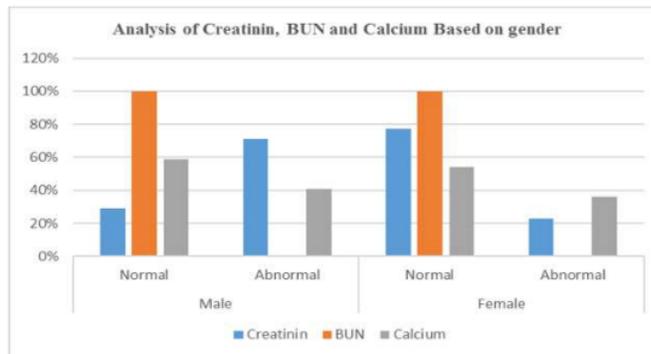


Figure 4. Analysis of Creatinin, BUN and Calcium Based on gender in Dusun Gunung Kesan Timur Based on

figure 4 shows the results of creatinine, BUN, and calcium by gender. Males had normal creatinine levels of 5 (29%) and abnormal creatinine levels of 12 (71 percent). Normal creatinine levels were

found in 10 (77%) of females, while abnormal creatinine levels were found in 3 (23 percent). Both men and women had normal BUN levels is 100 percent, in the BUN results. The calcium levels in guys with normal calcium levels are 10 (59%) and those with abnormal calcium levels are 7 (41 percent). Normal calcium levels were 7 (54%) in the female sex, while aberrant calcium levels were 6 (36 percent).

#### DISCUSSION

Based on the results of a study of 30 residents in Gunung Kesan Timur Hamlet who drank calcareous well water. The purpose of this study was to define the definitions of creatinine, BUN, and calcium levels. There are three indicators used to measure renal function in this study: creatinine, BUN, and calcium levels.

In figure 4 research, high creatinine levels are mostly found in men, this is in accordance with which states that gender can affect creatinine levels in the blood. Where men are more susceptible to increased creatinine levels caused by several factors, such as excessive physical activity, resulting in changes in muscle mass and is influenced by lifestyle, one of which is food. Women usually have lower creatinine levels than men, because women usually have less muscle mass. Creatinine is a metabolic waste of muscle protein, the amount of creatinine per unit of muscle mass is consistent and the level of creatinine breakdown is also consistent. Thus, the serum creatinine concentration is very stable and is a direct reflection of muscle mass. This is also in accordance with the statement of (Saputri *et al.*, 2019) which states that age and gender in older people have much higher creatinine levels than young people, while in men creatinine levels are higher than women.

In table 3, normal calcium levels were obtained as many as 17 people (57%) respondents. According to Getas, *et al* (2015) normal blood calcium levels are influenced by the lifestyle and physical activity of each individual, so that reducing the level of calcium absorption in the kidneys can reduce the rate of kidney stone formation. This is in line with (Ida Bagus Rai Wiadnya, 2018) that normal blood calcium is caused because calcium metabolism in the body runs normally and there are no disturbances in the factors that affect blood calcium levels. Calcium levels are controlled by various factors including the intake of nutrients received by the body. In addition, control was also carried out by 1,25-dehydroxycholecalciferol, parathyroid hormone, calcitonin, phosphorus, protein, and estrogen. As many as 13 people (43%) of respondents had calcium levels above normal, this was due to the drinking water used by the people of Dusun Gunung Kesan Timur, namely well water containing lime which was consumed without prior processing. In addition, excessive intake of calcium-containing foods also affects calcium levels in the blood. An increase in blood calcium in serum is a condition in which the body absorbs more calcium than it needs. In the formation of calcium stones there is an increase in the serum calcium concentration. This suggests that calcium stone formation is a manifestation of altered regulation of Ca and vitamin D (Ketha *et al.*, 2015).

According to research (Sumampouw, 2010) said that although it is not known the amount of exposure and the time it takes calcium intake into the human body can increase the risk of kidney stones. It must be admitted that the occurrence of kidney stones is not only due to calcium intake but is caused by many factors such as intake of phosphate, fluids, fiber and so on. In addition, life behavior, age, parental disease history and weight also affect the occurrence of kidney stones.

In general, the homeland has a high level of hardness. The cause of hardness is because groundwater is in direct contact with Calcareous Water which is classified as having soft to high hardness. The hardness of this well water is temporary hardness so that it can be reduced by heating and deposited, resulting in the formation of insoluble and precipitated calcium carbonate salts (Astuti *et al*, 2016).

Based on the survey results, respondents drink their well water directly without boiling it. According to Sumantri's research cited by Yazid & Afda'u (2016), it is often said that the hardness obtained in the air is used as a raw source of clean water sourced from the soil or whose soil contains lime and mineral salt deposits. Hard water is not very good for domestic use and industrial use.

#### CONCLUSION

Conclusion:

Based on the results of the study, it can be concluded that creatinine from 30 samples was known that 25 (83%) samples had normal creatinine levels and 5 (17%) samples had abnormal creatinine levels, while the BUN results for 30 samples were stated to be 100 percent normal, and calcium results were obtained. namely 13 samples (43%) were declared abnormal and 17 samples (57%) were declared normal.

Recommendation:

It is preferable for Paleo Laok villagers to drink water from taps or low-calcium water, or to purify well water before consuming it.

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