The Effect of Energy Supplements on The Levels of Gamma Glutamyl Transferase (GGT) Enzymes

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Abstract. Gamma Glutamyl Transferase is one of the most sensitive microsomal enzymes to detect liver parenchymal diseases. Gamma Glutamyl Transferase is an examination performed to measure the levels of GGT enzymes in the blood. The purpose of this study was to determine the results of GGT levels on bus drivers PT. Gipuraning Rahayu Ciamis who consume energy supplements with a total of 30 respondents. This research is descriptive, the data used are primary data presented in tabular form, incorporating narration. Based on the research that has been done on 30 respondents with the result 8 (27%) respondents high Gamma Glutamyl Transferase examination and 22 (83%) respondents with normal results. It can be concluded that the consumption of excessive energy supplements can increase Gamma Glutamyl Transferase levels.

1. Introduction
The lives of modern people who are always active and working hard, resulting in more frequent fatigue. This fatigue can be caused by the energy source that is owned by the body decreases or runs out, lactic acid increases, fluid and electrolyte balance is disturbed resulting in the onset of weakness, lethargy, and decreased concentration. One way that can be used to reduce or eliminate fatigue is by consuming energy supplements that contain vitamins and minerals that are needed and easily absorbed by the body [1].

Energy supplements are a type of supplement that aims to increase the energy of someone who drinks it. Energy supplements contain several ingredients such as vitamins, minerals, amino acids or other ingredients that have nutritional value and or concentrated physiological effects. Energy supplements can be packaged in liquid, capsule or powder form with various brands [2].

In energy supplements the content of niacin and caffeine is more than the content of vitamins and minerals. Caffeine in energy supplements has an effect like nicotine on cigarettes that can make people become dependent. Niacin and caffeine compounds are not energy source molecules but only function as simulants. Niacin combination and caffeine in energy supplements will stimulate the central nervous system to trigger a catabolism reaction (a reaction to produce energy ) in the muscle [2].

Data from the Ministry of Health of the Republic of Indonesia (Ministry of Health RI) in 2011 that the incidence (prevalence) of cases of failed liver function in Indonesia reached 5 to 10 percent of the total population, or equivalent to 13.5 million sufferers. This number makes Indonesia the third largest country in Asia. In Indonesia, sufferers who suffer from cases of liver function failure are mostly...
caused by consumption of drugs, including dietary supplements and the habit of consuming energy drinks. This is different in western countries that have suffered cases of failed liver function caused by the hepatitis B virus after adulthood through sexual transmission [3].

In a healthy body condition, excess substances in energy supplements will be processed first in the liver and then excreted by the body through urine fluid, sweat or faeces. The work of the liver or liver becomes much heavier with the presence of stimulant ingredients such as taurine and caffeine contained in energy supplements. Direct toxicity will occur in a matter of hours and is fatal with death, while the toxicity effect does not occur directly due to long-term accumulation by slowly causing liver damage [4].

Damage to liver function can be caused by various things, the habit of consuming alcoholic beverages, viral infections, to the consumption of certain drugs in the long term. Lately there are often people who experience liver damage problems as a result of the passion for energy drinks [5].

Consuming one bottle of energy drinks is the same as consuming 40 mg of niacin. If consuming excessive niacin will cause liver damage, with an LD50 limit niacin is 50 mg / kgBB. Niacin needed by the body is based on the Nutrition Adequacy Rate (RDA), which recommends the consumption of niacin 14 mg / day in adult women and 16 mg / day in adult men [6].

On this basis, Islam pays attention to patterns eat and drink for health that is not excessive. One of the words of Allah SWT in Surah Al-Baqarah verse: 168, meaning: Hi, all people, eat what is lawful again and what is good which is on the earth, and do not follow the steps of shaitan, for verily the devil is a real enemy to you.

The verses of the Qur'an above explain that food and drinks ordered by Allah SWT to be consumed are not only halal but Allah SWT also orders to consume good food and drinks. The intended foods and drinks are good that is not excessive, as well as consuming energy supplements if excessive (not according to the rules) it will cause a disease that is damaging liver function.

Laboratory examination is a special examination procedure and procedure by taking samples from patients that can be used to help determine the diagnosis of disease, detect disease, monitor the progress of treatment made based on disease history and physical examination[5].

Examination used to find out liver damage is examination of Gamma GT, ALP, Billirubin, SGOT and SGPT. However, Gamma GT examination is a more sensitive test to detect various types of liver parenchymal disease. Gamma GT is one of the microsomal enzymes that increases in the use of alcohol, drugs, and consuming energy drinks. Gamma-glutamyl transferase (Gamma GT) is an examination performed to measure the level of the GGT enzyme in the blood. GGT enzyme functions as a means of transportation in the body. GGT plays an important role in the metabolic process of drugs, energy supplements, and other toxic substances in the liver. GGT enzymes are mainly found in the liver, while in low amounts are also found in the spleen, pancreas, and kidneys[5].

Based on the results of a preliminary survey conducted by researchers on December 3, 2017 on bus drivers at PT. Gapuraning Rahayu Ciamis is that all Bus drivers as many as 42 people consume Energy Supplements, 75% of which are 32 people from all bus drivers consume every day. Therefore the researchers conducted a Gamma Glutamil Transferase (GGT) examination study on bus drivers PT. Gapuraning Rahayu Ciamis who consumed energy supplements.
2. **Theoretical basis**

2.1. *Energy Supplements*

Energy supplements are a type of drink that is intended to increase energy, freshness, metabolic stimulation, and the stamina of a person who drinks it [4].

According to [1] an energy supplement is said to be good if:

a. Does not contain harmful substances
b. Contains stimulants that are safe and in the right amount
c. Increase concentration and alertness
d. Contains vitamins
e. Antioxidants
f. Contains minimal additives or is completely free.

2.2. *Content of Energy Supplements*

According to [1] the content of energy supplements consists of:

2.2.1. **Vitamin**

Vitamins are substances of complex compounds that are needed by the body and function to help regulate or process the body's activities. Vitamin deficiency can cause the body to be susceptible to illness or decreased immune system. Many types of vitamins contained in energy supplements are vitamin A, vitamin B complex, vitamin C, vitamin D, vitamin E.

2.2.2. **Caffeine**

Caffeine is an isolate derived from coffee plants, tea and cocoa beans. Then caffeine is the type of stimulant that is most consumed by the general public.

2.2.3. *Gingseng and Ginger*

Gingseng is an herb that is often added to energy supplements. Gingseng is useful for increasing body stamina, while ginger in an energy supplement functions as a stimulant, increases appetite and tonic.

2.3. *Forms of Energy Supplements*

According to [2] forms of energy supplements, namely:

2.3.1. **Capsule**

Types of energy drinks that are usually packaged in capsule form are several types of vitamins that are easily soluble, such as vitamins A, D and E. The form of the capsule has only a little extra substance because it is relatively easy to absorb.

2.3.2. **Tablet**

Some types of energy supplements in the form of tablets are energy supplements that contain vitamin B12. Vitamin B12 is formulated in the form of tablets to be more easily absorbed into the blood vessels without being mixed with stomach acid or enzymes in the gastrointestinal tract.

2.3.3. **Liquid**

Energy-based supplements in the form of liquid are not only easily swallowed but can also be given additional flavor. Some types of energy supplements made in liquid form are energy supplements that contain vitamin E.

2.3.4. **Powder**

Types of energy supplements made in powder form include energy supplements that contain vitamin C and other additives such as ginger and royal jelly.
3. Results
The research was conducted on bus drivers PT. Gapuraning Rahayu Ciamis who consumed energy supplements on May 29, 2018 with a total of 30 patients. Before checking the samples, Quality Control is done using normal control materials, while the results of the normal control examination are 18 U / L with a range of 15-60 U / L, this means that the tools and reagents can be used in conducting sample checks.

Data from Gamma Glutamil Transferase examination results on bus drivers PT. Gapuraning Rahayu Ciamis who consumes energy supplements can be seen in appendix 9. High levels of Gamma Glutamil Transferase examination results are 8 people (27%), and 22 people (73%) with normal results.

Based on the results of a study of 30 bus drivers who met the criteria, it was found that Gamma Glutamyl Transferase (GGT) levels were high (male > 55 U / L) which was 8 people, while Gamma Glutamyl Transferase (GGT) levels were normal (male < 55 U / L) as many as 22 people.

4. Discussion
Based on the results of research from 30 samples of bus drivers PT. Gapuraning Rahayu Ciamis who consumes energy supplements can be described as a number of samples with abnormal Gamma Glutamyl Transferase (GGT) levels with a high value of 8 people (27%), while normal Gamma Glutamyl Transferase (GGT) levels are 22 people (73%) .

This Transferase Gamma Glutamy examination research was carried out from the pre analytic, analytic, and post analytic stages. Pre analytic starts from the preparation of tools and materials, sampling and transportation of samples from the place of taking to the laboratory for Gamma Glutamil Transferase examination. Sampling was carried out with three retrieval times, namely morning, afternoon, and evening by using vacutainer tubes without anticoagulants (close red). Before carrying out a sample inspection, a normal control material is checked first which is treated the same as a sample to ensure accurate inspection results. Examination of normal control material results in 18 U / L with a range of 15-60 U / L, so that it can be continued with the sample examination.

Gamma Glutamyl Transferase (GGT) levels can be influenced by a number of factors, including taking drugs, alcohol intake, and consuming high-energy supplements in a long time. In accordance with the theory of factors that can influence the findings of the Gamma Glutamyl Transferase (GGT) examination laboratory, the drug phenytoin and flaccid can cause a false positive Gamma GT test[7]. After interviewing respondents, they did not consume phenytoin and bituric drugs and alcohol intake. So that an increase in Transferase Gamma Glutamate levels is only affected by consumption of energy supplements.

In a healthy body condition, if you consume energy supplements every day but comparable to consuming water, it will reduce the toxic effects. Because the content in energy supplements is caffeine and niacin in the body will dissolve in water. So that the results of Gamma Glutamil Transferase examination are normal.

The results of Gamma Glutamil Transferase examination obtained 8 people with high results (abnormal) and 22 people with normal results. Increased Transfer Gamma Glutamate levels to 8 bus drivers occur because every day consume high-dose energy supplements that are more than 2 bottles (250 mL size) in a period of more than 5 years and rarely drink water which is less than 10 glasses per day. In accordance with the theory which states that the use of excess energy supplements chronically can cause damage to liver tissue, and will increase asymptomatic levels of aminotransferase enzymes[2]. While for patients with normal Gamma Glutamil Tranferase levels as many as 22 people, they have just consumed kratingdeng energy supplements between 2-3.5 years and they consume 2 bottles (250 mL size) every day, they also consume more than 10 glasses of water every day .

In patients on behalf of Dadang Gamma Glutamyl Transferase levels are very high based on interviews with patients, patients with Dadang rarely consume water which is less than 8 glasses per
day, and often experience symptoms of nausea and indigestion. Based on the theory of initial symptoms of hat damage namely easy fatigue, decreased appetite, digestive disorders, urine color changes, color changes stools, and stomach nausea[8].

Research on Transferase Gamma Glutamate levels based on consuming energy supplements can be concluded that Transferase Gamma Glutamate levels increase if consumed every day in a very long period of time.

5. Conclusion

Based on the results of research conducted on 30 bus drivers PT. Gapuraning Rahayu Ciamis, who consumed energy supplements, obtained high levels of Gamma Glutamyl Transferase as many as 8 people (27%) and normal Transferase Gamma Glutamate levels of 22 people (73%).

6. References

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