



Effectiveness of Figs (*Ficus carica L.*), Rosy Periwinkle (*Catharanthus roseus*) and Cherry (*Muntingia Calabura L.*) Decoction on Decreasing SGOT and SGPT Serum in Male Wistar Strain Rats with Acute Hepatitis Model

Grace Arni Yunita Hutajulu¹, Untung Sudharmono²
Faculty of Nursing, Adevntist University of Indonesia
gracearniyunita@gmail.com

ABSTRACT

Acute hepatitis is inflammation of the liver. This disorder is usually caused by a virus or exposure to alcohol, drugs, toxic, or other pathogens. The purpose of this study was to determine the effectiveness of figs leaves (*Ficus carica L.*), Rosy Periwinkle (*Catharanthus roseus*), and cherry (*Muntingia Calabura L.*) decoction on decreasing serum levels of SGOT and SGPT. The objects in this study were 30 male Wistar strain rats aged 2-3 months with a weight of 180-200 grams. Rats were randomly divided into 3 groups: the treatment group, positive control and negative control. The treatment group and positive control group were induced paracetamol 120 mg / day orally for 7 days. Boiled water of 0.3 grams Figs (*Ficus carica L.*), 3.5 grams of rosy Periwinkle (*Catharanthus roseus*), and 3.5 grams of cherry (*Muntingia Calabura L.*) was given as much as 3.6 cc orally for 7 days to treatment group. Data were analyzed with SPSS version 24, One Way ANOVA test was performed to compare SGOT and SGPT levels. The results showed a significant difference in SGOT levels between the treatment group, positive control group, and negative control group ($p < 0.05$) and there were significant differences in SGPT levels between the treatment group and positive control group ($p < 0.05$). The conclusions of this study were mixed boiled of Figs (*Ficus carica L.*), rosy Periwinkle (*Catharanthus roseus*), and Cherry (*Muntingia Calabura L.*) had an effect in decreasing serum SGOT and SGPT in male rats with acute hepatitis model.

Keywords: Paracetamol, SGOT, SGPT, *Ficus carica L.*, *Catharanthus Roseus*, *Muntingia Calabura L.*

INTRODUCTION

Healthy is something that everyone desires. Free from illness and live an optimal life. The ability of humans to carry out their activities is very dependent on the condition of the body of the person himself. As known that humans interact directly with the environment, it makes them hard avoid substances or materials in the form of free radical. Umayah (cited in Agustina, E) states that free radicals comes from cigarette smoke, dust, chemicals, vehicle fumes, drugs,

poisons and other pollutants, or even can be found in food that are not processed properly. Society needs to know the factors that influence the occurrence of a disease, at least from the surrounding environment such as living conditions, schools and workplaces, and then from public places that regularly visited such as tourist attractions, but the most important is to know the importance of personal health. This can be a smart action to protect personal and family health.

An extraordinary event has occurred in the Trenggalek, East Java and continues to spread widely. The data stated by the head of the East Java health department approximately 227 people suffer for hepatitis A, and many also have hepatitis B and C. According to data from the East Java Health Office there are around 303 residents detected with hepatitis. This extraordinary outbreak that occurred in the Trenggalek occurred around January to May 2019. The head of the East Java Health Office finally sent an epidemiological survey team to the Panggul, Trenggalek to prevent the rapid spread and certainly not casu other casualties. Various effort is made to cure the infected people and to decrease the outbreak (Puput, 2019)

The commemoration of World Hepatitis Day is in July 28. The public must pay attention to the hepatitis disease, Indonesia is a country with the highest rate of hepatitis B infection, the symptoms are sometimes not visible but usually infected people feel lethargic, nausea and vomiting, and decreased appetite. Patients also experience mild fever, there are some who experience pain in the abdomen. The incidence of hepatitis show a significant in Indonesia, not a few of which occurred in infants, then appealed for infants to be immediately given hepatitis immunization (Antara, 2019)

It is undeniable that there are still many people living in cities and villages who rely on chemical drugs bought based on a doctor's prescription or in places that sell drugs freely according to their needs and complaints. People are also familiar with paracetamol which is often used when there are family members who experience fever, in addition it is easy to find paracetamol, and it is often a mainstay of the community in reducing fever and pain because it has become a habit to consume drugs such as paracetamol.

Paracetamol is a mild pain reliever, but if you use it for a long time it can damage the liver function. Anindhita Maharrani (2017) reports that there have been many researchers from abroad bringing up about paracetamol which damages the liver that is by damaging important structur between adjacent cells in the organ. If there is damage to the wall of the cell, there will be damage to the tissue structure in the liver as well. And finally, the cells in the liver are unable to work properly and die. The liver is a vital organ for the body

Indonesia is rich with kind of flora and fauna that is widespread throughout the region. People living in rural areas often use herbal made from plants or animals into a mixture of traditional medicines that are believed to be efficacious.

Abednego Bangun (2016) argues that the legacy of our ancestors has been preserved in the era of globalization. There are many leaves that are effective in healing many diseases such as hypertension, coughing, kidney stones, diabetes, and even cancer. What amazing is that the plants that live around and we consume it has many benefits, even some of them are medicines that carry miracles until now. Therefore the research uses herbal ingredients that are around the community and is carried out with the aim to determine the effectiveness of figs (*Ficus carica* L.), rosy periwinkle (*Catharanthus roseus*), and cherries (*Muntingia calabura* L.) decoction on decreasing serum SGOT and SGPT in acute hepatitis. These plants contain antioxidants which are very useful for counteracting or overcoming free radicals.

This research utilizes a decoction of nutritious leaves in the process because it is easily processed by the community and easily obtained. Many numbers of hepatitis victims are spread in Indonesia, so in this study, researchers are motivated to look for alternative treatments for hepatitis by finding nutritious herbal.

According to the Law of the Republic of Indonesia Number 36 Year 2009 about healthy "Traditional medicine is an ingredient or ingredient in the form of plant material, animal material, mineral material, galenic, or mixtures of these materials which have been hereditary for use as a medicine, and it can be applied in accordance with the norms prevailing in society".

LITERATURE REVIEW

The liver is the largest gland in the human body. This organ is very meaningful in life because the liver has a variety of functions ranging from biochemical or metabolic functions. Liver has the main function in forming and secreting bile, useful in the process of metabolism of nutrients and vitamins, inactivation of various substances such as toxins and other hormones, the formation of plasma proteins and also as a part of the body's defense or immune system (Kim, Susan, Scott, Heddwen, 2017). If the liver is overworked and always exposed to pathogens, hepatitis will occur. Hepatitis is inflammation of the liver that can be caused by drugs, consuming too much alcohol, can also caused by a virus, toxic substances, or other pathogens and other mechanisms that will damage cells in the liver and even interfere with the liver to perform its function. (Priscilla, Karen, Gerene, 2017). Hepatitis is characterized by an increase

in levels of SGOT and SGPT serum in the liver. The term "hepatitis" is used for all types of inflammation in the liver.

Signs and symptoms found in patients with acute hepatitis are often not seen, but the signs and symptoms that often arise are jaundice on the sclera, skin or mucous membrane. Pruritus can also occur in people with hepatitis. When defecating, the stools are light brown and gray. The inflammatory process can disrupt the flow of bile through the bile canaliculi and into the bile system which then causes jaundice. Nutrient metabolism, drugs, bile elimination processes, or toxins are disturbed due to hepatitis inflammation (Kim, Susan, Scott, Heddwen, 2017).

According to Basic Health Research (RISKESDAS 2018) the prevalence of hepatitis based on the diagnosis of doctors (specialist doctors and general practitioners) by province in 2013-2018 was the highest attack is in Aceh (0.7%) in 2003 and Papua (0.7%) in 2018 and which least attacked the Bangka Belitung and Riau Islands regions in 2018.

Measurement of SGOT (Serum Glutamic Oxaloacetic Transaminase) and SGPT (Serum Glutamic Piruvic Transaminase) levels was carried out to detect the inflammation in the body and used to indicate inflammation in the liver and found more serum SGPT than SGOT in the liver. Indicators that can indicate inflammation in the liver refer to the SGOT value since it is more specific. While an increase in SGPT levels can occur in diseases that attack other organs such as acute kidney failure, acute pancreatitis, acute hemolytic anemia, myocardial infarction, trauma, burns, or diseases that attack the musculoskeletal system (Ahmad, Banundari, 2017).

Paracetamol is the most popular drug in dealing with relieving pain and fever. Fitri, Asep and Waluyo (2019) stated that paracetamol is currently a pharmacological therapy recommendation in the management of acute and chronic pain established by WHO (World Health Organization). Excessive consumption of paracetamol will cause liver damage, the damage is called hepatotoxicity. Reported in the United States about 65-75% use paracetamol as well as Europe, about 50% more consume paracetamol, this supports reports of cases of acute liver failure due to paracetamol use.

Hepatotoxics occur due to overuse of both in dose and in period of time dose and repeated, it happen as the reaction of the metabolite NAPQI (N-acetyl-p-benxoquinoneimine). NAPQI production will continue to grow, making it not comparable to the levels of glutathione in the liver which will eventually cause necrosis of liver cells. (Yusri et al., 2015)

The active compound in the form of flavonoids can prevent liver damage due to its antioxidant effect which is efficacious, the higher the flavonoid content in plants the better it protects cells

in the liver. Antioxidants work to inhibit free radicals by inhibiting various oxidation reactions in the liver and then avoiding damage (Fitri et al., 2019; Soeksmanto et al., 2007).

Indonesian society has been used plants as nutritious ingredients or traditional medicines for a long time. There also has a various way to consume it based in the customs and culture of each region. The life of rural communities in Indonesia is still very traditional, but it does not rule out the possibility of many people who glance at the plants are only used to decorate the yard, or only grow on the side of the road as a wild plant, or just live to balance the ecosystem. Most people do not know the benefits of plants created by the Almighty around them.

An effective and fairly safe treatment method is by using herbal medicine, which is to mix plant ingredients and is often called botanical treatment. There is a chemical elements in plants that affect the body. This herbal treatment is a mainstay for people, especially those living in rural areas or those who sufferers immunity to the chemical drugs offered by health services. Many communities provide their land to be used as place to medicinal plants. Herbal medicine will restore the body's mechanisms, especially primitive societies that highly depend on nature which provide them medicine, food, shelter, or clothing. (Abednego, 2016, p.16)

In the United States of America there is at least one natural herbal ingredient which is extracted to be an ingredient in every medicine production, the rest is synthetic material which is formed based on how the original components of plants work. (Abednego, 2016, p.17)

According to Eva (2017) one of the compounds that is very effective against free radicals that attack the body is antioxidants. This compound block the oxidation reaction. Plants that is used in this sudeys is figs (*Ficus carica* L.), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia calabura* L.).

Ficus carica L or commonly called fig plant is a plant with a high potential for antioxidant, it found in its leaves, fruit, fruit peels. Joseph and Raj (quoted from Agustina, E) wrote that besides antioxidants figs (*Ficus carica* L.) also contained phenolics, flavonoids, β -carotene, several bioactive compounds such as arabinose, and also glycosides. Moreover, Figs (*Ficus carica* L.) also contained fiber, vitamins A and C, potassium, calcium and also magnesium which are useful for the body. Dried figs have a source of carbohydrates and minerals. In line with Fadillah (quoted from Amin et al.), she states that there are flavonoid contents in tin leaves that function as antioxidants.

Classification of Figs according to Medika study (quoted from Anggraeni)

Kingdom : Plantae
Subkingdom : Tracheobionta

Super divisi	: Spermatophyta
Divisi	: Magnoliophyta
Kelas	: Magnoliopsida
Subkelas	: Dilleniidae
Ordo	: Rosales
Famili	: Moraceae
Genus	: Ficus
Spesies	: Ficus carica

Rosy periwinkle (*Catharanthus roseus*) is often found in the back yard of the houses and used as decoration or roadside and grow as wild plants. This plant is easy to grow in various climates, it has a quite thick leaves. These plants are widely spread in areas in Indonesia with their various names. It is said that the tread plant contains 70 types of alkaloids in parts such as leaves, seeds, stems and roots. Alkaloids contained in the rosy periwinkle are used as an anti-cancer. Other ingredients are flavonoids, saponins and tannins. It has been found that the properties of rosy periwinkle such as destroying kidney stones, treating DM and so on (Abednego, 2016, p. 336-339). Classification of rosy periwinkle according to Kardinan 2003 :

Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Gentianales
Family	: Apocynaceae
Genus	: Catharanthus
Species	: Catharanthus roseus

Cherry (*Muntingia calabura* L.) is one of the plants that contains antioxidants and is useful for increasing intake from the outside for the body's antioxidant needs (Lily, Novi, 2014).

Cherry (*Muntingia calabura* L.) is also often used for lowering blood sugar level because it contains flavonoids, in addition there are also other nutritious ingredients such as saponins and tannins (Breckerts et al., 2018)

In the study of Sari (quoted from Zahara, M. And Suryady) the Cherry is classified into :

Kingdom	: Plantae
Divisi	: Spermatophyta
Anak divisi	: Angiospermae
Kelas	: Dicotyledoneae

Anak Kelas : Dialypetalae
Family : Malvales/Columniferae
Ordo : Elaeocarpaceae
Genus : Muntingia
Spesies : Muntingia calabura L.

METHODS

Laboratory experiments are the method used in this study, with 30 male Wistar strain rats as the experiment that had been adapted for 7 days, the rats were 2-3 months old with a body weight of 180-200 gr, After adapting the change in body weight of male Wistar strain rats is \pm 10%, then 30 male Wistar strain rats that meet these criteria are grouped into 3 (three). The first group is the negative control group, the second group is the positive control group, while the third group is the treatment group.

The plants used in this study are figs (*Ficus carica* L.), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia calabura* L.). These plants are grow a lot around the yard of the house and are used as traditional medicine and also as decoration. Laboratory tests in this study were examination of serum levels of SGOT and SGPT.

The object of this study are 30 male Wistar strain rats. The procedure in this study was to adapt wistar strain male rats for 12 hours of light or during the day and 12 hours of dark or at night for 7 days in the laboratory. Wistar strain male rats then grouped into three; first is negative control group. In this group, Wistar strain male rats are given normal food and drink without being damaged to its liver or given therapy. The second group was the positive control group, it is the group of male wistar rats that the liver is damaged by inducing paracetamol as much as 120 mg orally for 7 consecutive days (days 8 to day 14 in this study), but this group was not given therapy. Next is the third group, this is a that has been induced paracetamol at a dose of 120 mg orally for 7 days then given therapy of figs (*Ficus carica* L.), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia calabura* L.) decoction during 7 days.

The fig (*Ficus carica* L.) plant in this procedure is that the fig leaves that have been dried in the room light, as well as the rosy periwinkle (*Catharanthus roseus*), the leaves, stems and even the roots are also cut into pieces and then dried, rosy periwinkle was taken from the Parongpong area, West Bandung. Finally, cherry (*Muntingia calabura* L.) leaves are taken and cut into smaller parts and then dried, the next step is that cherry is combined into a therapeutic mixture

in this study. Cherry plants (*Muntingia calabura* L.) in this study is taken from the Parongpong area, West Bandung.

On the 15th day a laboratory examination was carried out by taking blood samples from the tail end of the male wistar rats that were cut to determine the serum levels of SGOT and SGPT, and on the 15th day also began to give boiled water treatment of fig (*Ficus carica* L.), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia calabura* L.) orally every day for 7 days until the 21st day. The therapy consist of 0.3 grams of Figs (*Ficus carica* L.), 3.5 grams of rosy periwinkle (*Catharanthus roseus*), and 3.5 grams of cherry (*Muntingia calabura* L.) which is boiled in 200 ml water to 100 ml and from all the cooking water was taken 3.6 ml to be given orally to the male Wistar strain rats for 7 days. Furthermore, on the 22nd day, serum levels of SGOT and SGPT were examined in male Wistar strain rats to determine the results after treatment or therapy.

RESULTS

Table 1. **Result**

Dependent Variable	(I) kelompok	(J) kelompok	Mean Difference (I-J)	Std. Error	Sig.
SGOT_Pre	1,00	2,00	-226,92000*	12,75364	,000
		3,00	-203,46000*	12,75364	,000
	2,00	1,00	226,92000*	12,75364	,000
		3,00	23,46000	12,75364	,176
	3,00	1,00	203,46000*	12,75364	,000
		2,00	-23,46000	12,75364	,176
SGOT_Post	1,00	2,00	-963,23000*	16,30632	,000
		3,00	-82,20000*	16,30632	,000
	2,00	1,00	963,23000*	16,30632	,000
		3,00	881,03000*	16,30632	,000
	3,00	1,00	82,20000*	16,30632	,000
		2,00	-881,03000*	16,30632	,000
SGPT_Pre	1,00	2,00	-83,17000*	9,55826	,000
		3,00	-113,11000*	9,55826	,000
	2,00	1,00	83,17000*	9,55826	,000
		3,00	-29,94000*	9,55826	,011
	3,00	1,00	113,11000*	9,55826	,000
		2,00	29,94000*	9,55826	,011
SGPT_Post	1,00	2,00	-986,37300*	18,02617	,000
		3,00	-32,86300	18,02617	,181
	2,00	1,00	986,37300*	18,02617	,000
		3,00	953,51000*	18,02617	,000
	3,00	1,00	32,86300	18,02617	,181
		2,00	-953,51000*	18,02617	,000

*. The mean difference is significant at the 0.05 level.

DISCUSSION

This study the data was analyzed and validate using SPSS (Statistical Product and Service Solution) version 24. The results of pre-laboratory test of SGOT serum level showed that the negative control group (1st group) with the positive control group (2nd group) had a significant comparison ($p \leq 0.05$) because the liver of the positive control group was destroyed due to inducing 120 mg of paracetamol and was not get the treatment so SGOT level increase. The negative control group (1st group) was also significantly different from the treatment group (3rd group), because the liver of the treatment group was also damaged and had not been treated. The positive control group (2nd group) was not significantly different from the treatment group (3rd group) because the liver of both groups were damaged by the. The treatment group had not been treated at the pre test.

Seen from the results of the SGOT post test it was found that the negative control group (1st group) was significantly proportional to the positive control group (2nd group), because the liver of positive control group was damaged and the SGOT levels in the blood of the rat increased while the liver of the negative control group was not damaged and were given eat and drink as usual. The negative control group (1st group) was significantly different from the treatment group (3rd group) because the treatment group had received a water treatment from figs (*Ficus carica L.*), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia calabura L.*) decoction but had not approached normal value. The positive control group (2 nd group) compared with the treatment group (3rd group) there was a significant comparison because the liver of both the positive and treatment control group was damaged but then the treatment group go the therapy and the level of SGOT serum decrease

The pre-test of SGPT showed that the negative control group (1st group) had a significant comparison compared to the positive control group (2nd group), because the positive control group was induced 120 mg of paracetamol which damaged the liver while the negative control group was not induced by paracetammol. There was a significant comparison between the negative control group (1st group) and the treatment group (3rd group), because the liver of treatment group and had not been treated. Between the positive control group (2nd group) with the treatment group (3rd group) there was an insignificant comparison, because the liver of male rats in the positive control group and the treatment group were equally damaged by

paraetamol 120 mg orally for 7 days and the treatment group had not been given therapy during the SGPT pre test.

Laboratory examination results for the SGPT post test group, found a negative control group (1st group) was significantly different from the positive control group (2nd group) because the liver of positive control group was damaged, its marked by an increase of SGPT levels in the blood of male Wistar rats and the liver of negative control group did not damaged. The negative control group (1st group) with the treatment group (3rd group) did not have a significant comparison because the negative control group was not induced paracetamol 120 mg orally then the liver of treatment group was damaged but it was given a therapy so that the SGPT levels in the post-therapy level decreased. The positive control group (2nd group) with the treatment group (3rd group) there was a significant comparison, because the liver of both groups were damaged but the treatment group had been given boiled water treatment therapy of figs (*Ficus carica* L.), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia calabura* L.). This is in line with the research of Oktavia and Wahyu (2018) which states that fig leaves are used as hepatoprotectors.

Conclusion

From this study it was found that by inducing paracetamol at a dose of 120 mg orally for 7 days was able to make male wistar rats experiencing acute hepatitis characterized by increased levels of SGOT and SGPT serum. The water therapy of figs (*Ficus carica* L), rosy periwinkle (*Catharanthus roseus*), and cherry (*Muntingia Calabura*) which has been dried is effective in reducing levels of SGOT and SGPT serum and requires a longer therapy to obtain maximum results in decreasing levels SGOT and SGPT serum in acute hepatitis.

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