International Journal of Scientific Multidisciplinary Research (IJSMR)
Vol.1, No.8, 2023: 1063-1076

The Effect of Gambir Leaves on Cholesterol Levels in Bangka Regency

Muhamad Seto Sudirman[1*], Eva Dewi R Purba[2], Auronita Puspa Pratiwi[3]
POLTEKKES KEMENKES Pangkalpinang
Corresponding Author: Muhamad Seto Sudirman Muhamadseto@gmail.com

A R T I C L E I N F O

Keywords: Gambir, Cholesterol, Bangka

Received : 10 July
Revised : 17 August
Accepted: 20 September

A B S T R A C T

People in the Province of Bangka Belitung Islands are still using medicinal plants inherited from their ancestors, especially in rural areas that are still far from the reach of health facilities organized by the government as a promotional, preventive and curative effort in overcoming health problems. Gambir leaves are a medicinal plant used to lower blood sugar levels which are used by ethnic Malays in the province of Bangka Belitung Islands. As to achieve the goal of the use of traditional medicine for public health, scientific evidence of quality, safety and efficacy is needed. How is the effectiveness of gambier leaves as a traditional medicine to lower blood sugar in ethnic Malays in the Province of Bangka Belitung Islands. Observe the clinical effectiveness (effectiveness) of the use of gambir leaf boiled water as a traditional medicine to lower blood sugar and determine the safety of the liver and kidneys of ethnic Malays in the Province of Bangka Belitung Islands. Development of a study of traditional medicine formularies used in patients with hyperglycemia disorders and found natural medicinal ingredients to be the most effective and without side effects on the liver and kidneys

DOI: https://doi.org/10.55927/ijsmr.v1i8.6242
ISSN-E: 2986-5042
https://journal.formosapublisher.org/index.php/ijsmr

INTRODUCTION

Non-communicable diseases (NCD) are familial or inherited diseases that can be detected by exploring the individual or family history of the disease. Non-communicable diseases commonly detected in the genogram include hypertension, diabetes mellitus, stroke, and osteoarthritis (Nita, Sharon & Henni, 2016).

Diabetes mellitus (DM) is a lifelong suffering chronic disease. Therefore, it requires clients and families' skills to take independent treatment actions at home to help control the client's blood sugar levels to avoid complications (Wulan, Natalia & Ermalinda, 2014).

Diabetes has specific symptoms such as frequent urination, constant hunger and thirst, weight loss, and fatigue. Suppose the symptoms of diabetes are not treated quickly. In that case, it may develop into more severe disorders such as heart disease, kidney failure, severe skin infections/gangrene, visual disturbances (cataracts), and blindness. Some actions to solve diabetes mellitus are normalizing blood glucose with a diabetes diet, administering diabetes medication, and explaining diabetes mellitus.

Global status report on NCD World Health Organization (WHO) in 2010 reported that 60% of global causes of death for all age groups are due to non-communicable diseases. Diabetes mellitus is ranked 6th as the cause of death. About 1,3 million people die from diabetes, and 4 percent die before age 70. It is predicted that diabetes mellitus is the 7th leading cause of death globally by 2030 (Ministry of Health of the Republic of Indonesia, 2013).

The latest estimation of the International Diabetes Federation (IDF) reported that 382 million people were living with diabetes in the world in 2013. This number is predicted to increase to 592 million people by 2035. It is estimated that of the 382 million people, 175 million have not been diagnosed. Thus, they are in danger of developing progressive diabetes and turn into complications without realizing it and without prevention (Data and Information Center of the Ministry of Health of the Republic of Indonesia, 2014).

The International Diabetes Federation (IDF) states that more than 371 million people in the world aged 20-79 years have diabetes. Meanwhile, Indonesia is the 7th country with the highest diabetes prevalence, behind China, India, the USA, Brazil, Russia, and Mexico. People with diabetes mellitus in Indonesia are predicted to increase, totaling 21.3 million people by 2030 (Public Communication Center, Secretariat General of the Ministry of Republic of Indonesia, 2013).

According to Basic Health Research or Riskesdas (2013), the number of people with diabetes mellitus in Bangka Belitung Province diagnosed with diabetes mellitus by a doctor reached 19.842 people (2,1%). The number of people with diabetes mellitus who a doctor had never diagnosed but in the last one month had specific symptoms of diabetes mellitus reached 3.379 people (0,4%).
One example of the mistake of health workers against the herbal medicine paradigm is that many of them do not believe and even accuse traditional healers who use herbal medicines to conduct fraud. It is because the conventional preparations do not have scientific data on clinical trials. A clinical trial is a drug

test that has gone through in vitro tests, in vivo (preclinical) tests, and clinical observations to guarantee scientificity. One crucial aspect of scientific data in clinical trials is drug pharmacology (pharmacokinetics and pharmacodynamics). While the data can only be obtained if the drug being tested is a pure molecule or at least the molecular type is known. On the other hand, herbal medicine is a preparation containing a million unknown chemical molecules which act as drug markers. At the same time, rational drugs are chemical molecules synthesized by humans so that they are easily studied scientifically.

People in Bangka Belitung are still using medicinal plants passed down from their ancestors, especially in rural areas that are still far from the health facility services organized by the government as promotive, preventive, and curative efforts in overcoming health problems.

Gambier leaves (Uncaria gambir) is one of the plants used as a traditional medicine for lowering blood sugar levels in ethnic Malays in the Province of Bangka Belitung Islands. In order to achieve the goal of using traditional medicine for public health, scientific evidence is needed for its quality, safety, and efficacy.

Gambier contains alkaloids, tannins, dihydro tannins, oxo tannins, catechins, and flavonoids. The content of Gambier can control blood sugar levels, and therefore it is suitable for people with diabetes to consume it. The content of alkaloids has the function of facilitating the entry of nutrients. In this case, blood sugar enters and is processed in the body's cells. The more cells that process blood sugar, the more blood sugar levels can decrease. Alkaloids open the cell pores as a way into the cell and a way out of the body's metabolic products so that it does not only help to process blood sugar. The content of alkaloids helps the process of removing metabolic products from the body's cells.

In addition to alkaloids, Gambier also contains flavonoids. Flavonoids have significant benefits for health. Flavonoids are bioactive compounds found in fruits, nuts, seeds, and some vegetables and play a role in cell development. Several studies have shown that flavonoids can be used to treat diabetes. In a study using laboratory rats, it was found that the effect of flavonoid content can reduce aldose reductase enzyme, help regenerate pancreatic beta cells, and increase insulin secretion. Pancreatic beta cells are where the hormone insulin is produced. Thus, indirectly the content of flavonoids can increase the production of the hormone insulin as well.

This is supported by research conducted by Fauzan Azima with the Antidiabetic Test of Standardized Gambir Extract on White Male Mice with the results of standardized Uncaria Gambir Extract being able to reduce blood glucose levels in alloxan-induced diabetic mice (0,001)

Trina, Fitmawati, and Nery Sofiyanti conducted research entitled Identification of Antidiabetic Plants Based on Quantitative Analysis of Tannic Acid. This research identifies the antidiabetic plants by analyzing the tannic acid quantitatively, which compared to antidiabetic drugs that have been sold commercially. Determination of the total tannic acid content in this plant was tested using the Folin Ciocalteu method. The results found that the total content of tannic acid in antidiabetic drug extracts, jackfruit bark, gambir sap, raru bark,

jengkol bark, capo leaves, and sipait leaves was 21,01; 29,98; 40,95; 51,01; 51,84; 59,70; 60,16 mg/g extract, respectively. From the test results of the six antidiabetic plants, all of them have a value for the total content of tannic acid above antidiabetic drugs. Therefore, they have the potential as antidiabetic drugs.
Heny conducted research entitled..... This research identifies the antidiabetic plants by analyzing the tannic acid quantitatively compared to commercially available antidiabetic drugs. Determination of the total tannic acid content in this plant was tested using the Folin Ciocalteu method. The results showed the total content of tannic acid in antidiabetic drug extracts, jackfruit bark, gambir sap, raru bark, jengkol bark, capo leaves, and JOM FMIPA Volume 1 No. October 2, 2014 410, sipait leaves was 21,01; 29,98; 40,95; 51,01; 51,84; 59,70; 60,16 mg/g extract, respectively. From the test results of the six antidiabetic plants, all of them have a value for the total content of tannic acid above antidiabetic drugs. Therefore, they have the potential as antidiabetic drugs.

LITERATURE REVIEW

Gambir

Another plant that has an antidiabetic effect is the gambier plant (Uncaria gambir Robx). However, the dry extract is the part that is most commonly used. Research by Widiyarti et al. (2011) showed that Gambier has antioxidants from the polyphenol group, such as catechins. Gambir can inhibit the activity of free radicals and acts as an inhibitor of the α-glucosidase enzyme. Based on these studies, it is known that the IC50 value of catechins extracted with ethyl acetate for the inhibition of DPPH is 4,6-18,2µg/mL, and the IC50 value for the inhibitory effect of α-glucosidase is 40,45- 52,43 µg/mL. Therefore, Gambir can be classified as antidiabetic. Gambir is an extract/dried sap obtained from the leaves and young twigs of the gambier plant (Uncaria gambir Robx). (National Agency of Drug and Food Control of the Republic of Indonesia, 2009). This plant is a shrub with a height that can reach 3 meters. The shape of the stem is erect, round, and pale brown. The single leaf is green, oval with serrated edges, a rounded base, and a tapered tip. It has a length of 8-13 cm and a width of 4-7 cm. This plant has compound flowers, bell-shaped, purple color, with a crown consisting of five strands, with a length of 3-5 cm which usually appears in the axils of the leaves. The gambier plant also has oval and black fruit with a length of 1-1.5 cm (Hidayat and Napitupulu, 2015).

Gambir can only be planted at an altitude of 200-800 m above sea level with rainfall of about 3,300 mm/year and humidity of about 70-85%. Gambir can be planted in various types of soil that have a pH of 4,8-5,51 (Rauf et al., 2015). Gambier plant, and (b) Simplicia from Gambier (National Agency of Drug and Food Control of the Republic of Indonesia, 2009). Gambier plant (Uncaria gambir Robx) registered with Integrated Taxonomic Information System (ITIS) with serial number 506057. The gambier taxonomy hierarchy is as follows:

Kingdom : Plantae
Subkingdom : Viridiplantae
Infrakingdom: Streptophyta
Superdivision: Embryophyta
Division : Tracheophyta

Subdivision :Spermatophytina
Class :Magnoliopsida
Superorder :Asteranae
Order :Gentianales
Family :Rubiaceae
Genus :UncariaSchreb
Species :Uncaria gambir (Hunter) Roxb. (ITIS,2016)

Indonesia is known as a major producer of gambier plants in the international market. The total area of gambier plantations in Indonesia is 29.178 ha, of which 21.389 ha is located in West Sumatra. Gambier plantations in Indonesia are entirely People's Plantations. The export volume of Gambier reached 15.671 tons with a value of US $34.847 in 2013. The largest exporting countries are India with 14.114 tons, Pakistan with 859 tons, Bangladesh, Singapore, Japan, Malaysia, Vietnam, Korea, Nepal, Turkey, Sri Lanka, China, Saudi Arabia, Taiwan, and the United States (Sulkani,2015).

The processing of Gambier in each region in Indonesia is different. Thus, the levels of catechins produced are also different. In the Special Region of Aceh, the catechin content ranges from 70-80%. North Sumatra is 70-85%, West Sumatra is 40-80%, South Sumatra is 70-95%, Bangka Belitung is 70-80%, and Riau is 25-35%. The highest catechin content was found in Gambier processed in South Sumatra (Amos, 2010).

Based on Amos (2010), the processing of Gambier is as follows. Boil the leaves and twigs of the gambier plant for about an hour, then crushed them using a grinder. Put the crushed leaves and twigs into a pressing container made of rattan. After that, heat briefly. Pressing is carried out using hydraulics with a pressure of 2 tons. Put the results obtained in a mold made of square wood, cut into pieces with a size of 1x1x6 cm, and dry it.

Phenol of 272,875 mg GAE/g, catechin of 97%, and tannin of 25,1% (Melia, et al. 2015). The bioactive compounds contained in gambier are tannins in the form of catechins, protoanthocyanidins in the form of gambiriin A1, gambiriin A2, gambiriin A3, gambiriin B1, gambiriin B2, gambiriin B3, gambiriin C. Gambir also contains alkaloids in the form of dihydrogambirin, gambirdin, gambirtanin, gambirin, isogambirin, auroparin, and oxogambirtanin. Other ingredients include quercetin, epicatechin, epigalocatechin, and tannic acid (National Agency of Drug and Food Control of the Republic of Indonesia, 2009).

METHODOLOGY

Type of Research

This study is a clinical observation study of pre-post test design on traditional healers of Malay ethnic herbs in Puding Besar, Puding Besar Sub-district, Bangka Regency, Bangka Belitung Islands Province.

Place and Time of Research

1. The study was conducted at a traditional health care service for Malay ethnic herbs in Puding Besar, Puding Besar Sub-district, Bangka Regency, Bangka Belitung Islands Province, and Regional Public Hospital of Central Bangka.

2. The study was conducted from July 2020 − December 2020.

Research Design

This study is a clinical observation study on traditional health practice services using gambier leaves to treat diabetes mellitus.

Population and Sample

a. Subjects in this clinical observation were hyperglycemic patients with blood sugar levels.
b. The sample is 22 subjects
   The population is patients with hyperglycemia disorders who seek treatment from traditional healers (hattra) in empirical traditional health services. The patients are given boiled water from gambir leaves in Puding Besar, Puding Besar Sub-district, Bangka Regency, Bangka Belitung Islands Province.
c. Samples are patients who come for treatment with the above disorders during data collection.

Sample Size

The selected sample size is a minimum of 22 volunteers.

Inclusion and Exclusion Criteria

Inclusion Criteria:

1) Hyperglycemia patients with high blood sugar levels
2) Patients aged 17 years and less than 60 years
3) Patients do not use chemical drugs

Exclusion Criteria:

a) Patients have dyslipidemia with complications, such as arteriosclerosis, coronary heart disease, stroke, and other comorbidities.
b) Pregnant women
c) Patients are currently undergoing conventional treatment
d) Patients are not willing to participate in the research and willing to follow the research procedure by signing the informed consent
e) Signs and symptoms of complications were found during the study
f) Patients do not carry out clinical examinations according to research procedures
g) Patients withdrew from research at their own request

Variables

a) The independent variable is hyperglycemic patients using an ingredient of gambier leaves boiled water according to the methods and habits of traditional healers (hattra).
b) The dependent variable is a decrease in blood sugar levels
c) Side effects: clinical symptoms, routine blood, serum glutamic pyruvic transaminase (SGOT), serum glutamic oxaloacetic transaminase (SGPT), urea, and creatinine.

Materials and Work Procedure

Material

A. The raw materials used as simplicia are taken from traditional empirical healers (hattra) to lower blood sugar levels used by ethnic Malays in the Bangka Belitung Islands Province.

B. Research materials in the form of questionnaires, informed consent sheets, cameras, notes, and logbooks.

Treatment of Research Subjects

1. Researchers did not intervene on volunteers who went to traditional healers using traditional medicine of Gambier leaves boiled water.
2. The examination was carried out by a health laboratory that a traditional health practitioner had appointed.
3. Researchers collected data from pre and post-examinations using Gambier leaves boiled water.
4. Collecting data on volunteers who have met the inclusion and exclusion requirements according to the research protocol

Data Analysis

Data analysis in this study using the Paired Sample T-Test after conducting data normality test with the Shapiro Wilk test, and if the data is not normally distributed, it uses the Wilcoxon test.

Research Cost

The cost of tools, materials, and laboratory examinations comes from the 2020 Budget Implementation Document (DPA) for the Health Polytechnic of Pangkalpinang budget funds.

Ethical Considerations

The researchers request ethics approval before conducting the study to the Health Research Ethics Commission (KEPK) at the Health Polytechnic of the Ministry of Health Pangkalpinang.

RESULTS

Research Results

The results of the measurement of blood sugar, SGOT, SGPT, creatinine and urea in research subjects pre and post administration of gambir leaf boiled water for 14 days and analysis of results can be seen in the table and appendix.

Table 1. Results of Measuring Blood Sugar, SGOT, SGPT, Creatinine and Urea in Pre and Post Administration of Boiled Water from Gambir Leaves for 14 Days

Check Up Result										
No	**Gula Darah**		**SGOT**		**SGPT**		**UREUM**		**KREATININ**	
	Pre Test	**Post Test**	**Pre Test**	**Post Test**	**Pre Test**	**Post Test**	**Pre Test**	**Post Test**	**Pre Test**	**Post Test**
1	362	350	16	20	7	16	30	28	1	0,4
2	130	174	11	39	16	31	20	30	0,8	0,4
3	61	75	12	47	13	24	13	10	0,4	0,4
4	326	120	20	51	33		29		1	

5	175	80	18	51	19	23	16	15	0,6	0,7
6	202	116	20	18	40	29	24	20	0,7	0,9
7	118	302	6	6	6	5	24	29	0,8	0,9
8	194	300	19	8	13	8	28	23	1	0,7
9	305	305	24	10	16	14	27	27	0,9	0,6
10	359	302	48	24	30	21	33	16	1,1	0,5
11	164	300	20	11	14	14	25	17	0,9	0,6
12	371	500	29	10	18	14	31	30	1,1	0,6
13	148	200	34	14	22	18	25	23	0,8	0,6
14	292	350	26	12	19	15	27	32	1	06
15	123	110	44	44	20	15	20	14	0,6	0,7
16	364	391	47	30	26	17	26	22	0,6	0,6
17	337	361	23	9	15	9	34	22	0,6	0,9
18	264	329	84	37	32	12	22	18	0,8	0,4
19	244	269	42	24	27	21	16	17	0,4	0,4
20	113	55	99	52	48	33	20	18	0,8	0,7
21	218	339	45	31	26	20	25	24	0,6	0,8
22	350	293	24	21	20	16	33	28	1,1	1

Blood Sugar

a. Data Normality Test

Table 2. Data Normality Test Results on Pre and Post Test Data Blood Sugar Levels

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre Test Gula Darah	.132	22	.200*	.904	22	.035
Post test Gula Darah	.162	22	.136	.931	22	.126

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Based on data analysis before determining the test to be used, the normality value indicates that the data is not normally distributed, the Shapiro-wilk value is 0.065 and 0.001 means the value is <0.05. Furthermore, using Wilcoxon data analysis.

Means Blood Sugar Data on Subjects and Post Administration of Boiled Water Gambir Leaves for 14 Days

Table 3. Statistical Description of Mean Blood Sugar Level Measurement in Pre and Post Subjects Giving Gambir Leaf Boiled Water for 14 Days

Statistics

		Pre Test Gula	Post Test Gula
N	Valid	22	22
	Missing	9	9
Mean		228.1818	255.2273

Based on descriptive data, the frequency of observations of the average blood sugar measurement of gambier leaves for 14 days showed an increase in pre-test of 228.- post-test of 255.

Wilcoxon Test on Pre and Post Test Giving Gambier Leaf Decoction for 14 Days

Table 4. Description of the Wilcoxon Test Measuring Average Blood Sugar Levels in Pre and Post Subjects Giving Gambir Leaf Boiled Water for 14 Days

Test Statistics[b]

	Post Test Gula - Pre Test Gula
Z	-1.867[a]
Asymp. Sig. (2-tailed)	.062

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

DISCUSSIONS

In determining statistical tests on blood sugar measurements, the first thing to do is conduct the data normality test based on the results of the data normality test of blood sugar levels. Based on the Paired Sample Statistics test analysis, the observation of the mean of blood sugar measurement in the pretest and posttest subjects by giving the boiled water of gambir leaves showed a t-count value of 1.418 with a sig of 0.171. Because sig > 0,05 indicates no significant difference between the pretest and posttest of giving gambier leaves boiled water with a 95% confidence level and an error rate of 5%.

Based on Wilcoxon's analysis, the results of the observation of the mean of blood sugar measurement in pretest and posttest subjects by giving the boiled water of Gambier leaves showed a value of z -1.867 with a sig of 0,062 > 0,05. Because sig> 0,05 indicates no significant difference between the pretest and posttest of giving gambier leaves boiled water with a 95% confidence level and an error rate of 5%.

Only five research subjects experienced a decrease in blood sugar levels, probably due to the subject's irregularity in consuming gambir leaves. This study was observational and did not intervene strictly.

This study is different from the research conducted by Etriyanti et al. entitled The Effect of the Administration of Gambir on Blood Sugar Levels in Type II Diabetes Mellitus patients. The population in this study were all patients with type II diabetes mellitus in the working area of Koto Baru Community Health Center. The sampling technique was purposive sampling, with 16 people consisting of 8 people in the intervention group and eight people in the control

group. The data were processed computerized with univariate and bivariate analysis using the Independent T-Test. The results found that the mean blood sugar levels in the intervention group administered with gambir were 199,88 mg/dL, and the control group was 326,25 mg/dL. Based on statistical tests, it was found that p-value = 0,003 ≤ 0,05, which means that there is an effect of the administration of gambier and blood sugar levels.

As previously explained, Gambier contains alkaloids, tannins, dihydro tannins, oxo tannins, catechins, and flavonoids. The content of Gambier can control blood sugar levels, so it is good for diabetic patients to consume it. The content of alkaloids serves to facilitate the entry of nutrients. In this case, blood sugar enters and is processed in the body's cells. The more cells that process blood sugar, the more blood sugar levels can decrease. Alkaloids open the cell pores as an entryway into the cell and way out of the body's metabolic products. Thus, it does not only help the processing of blood sugar. The alkaloid content also helps the process of removing metabolic products from the body's cells. Some other fruits and vegetables that contain alkaloids can be read in the article: In addition to alkaloids, Gambier also contains flavonoids. Flavonoids have significant benefits for health. Flavonoids are bioactive compounds found in fruits, nuts, seeds, and some vegetables. It plays a role in cell development. Several studies have shown that flavonoids can be used to treat diabetes. In a study using laboratory rats, it was found that the effect of flavonoid content can reduce aldose reductase enzyme, help regenerate pancreatic beta cells, and increase insulin secretion. Pancreatic beta cells are where the hormone insulin is produced. Thus, indirectly the content of flavonoids can increase the production of the hormone insulin as well.

For generations, the people of Puding Besar believe that gambir leaves can cure diabetes mellitus. Therefore, people also use gambier leaves as a livelihood.

Based on the serum glutamic pyruvic transaminase (SGOT) data analysis before determining the test to be used, the normality value indicates that the data is not normally distributed. The Shapiro-Wilk value is 0,065 and 0,001 means that the value is <0,05. Further analysis was conducted using the Wilcoxon test. Based on the Wilcoxon Signed Rank Test calculation results, the Z value obtained is -1,476 with a p-value (Asymp. Sig 2 tailed) of 0.14, which is more than the critical limit of research of 0,05. Therefore, the hypothesis decision is to accept H1 or which means there is no significant difference between pretest and posttest, but based on descriptive data of the frequency of observations of the mean of SGOT measurement of gambier leaves for 14 days showed a decrease in the pretest of 32.3182 and posttest of 25.3182. The results indicate that consuming boiled water of gambier leaves has no effect on SGOT but instead decreased SGOT

The normality value indicates that the data is normally distributed based on the serum glutamic oxaloacetic transaminase (SGPT) data analysis before determining the test to be used. The Shapiro-Wilk value is 0,283 and 0,716 means that the value is >0,05. Based on the Paired Sample Statistics test, the results of observations of the mean of blood sugar measurement in pretest and posttest subjects by giving gambir leaves boiled water showed a value of t-count of 1.839 with a sig 0.080. Because sig >0.05 showed no significant difference between the pretest and posttest of giving gambir leaves boiled water with a 95% confidence

level and an error rate of 5%. However, the paired samples correlation test analysis showed a correlation between the observation results of SGPT measurements of 0,528 with a sig of 0.012. The results indicate a correlation between the mean of pretest and posttest of giving gambir leaves boiled water and the mean value of SGPT of gambir leaves for 14 days, showing a decrease in the pretest of 32.3182 and posttest of 25.3182. The result is proven by a total of 14 research subjects who experienced a significant decline in SGPT.

Based on urea data analysis before determining the test to be used, the normality value indicates that the data is normally distributed. The Shapiro-Wilk value is 0,66 and 0,679 means that the value is >0,05. Based on the Paired Sample Statistics Test analysis, the results of observations of the mean of urea measurement on pretest and posttest subjects by giving gambir leaves boiled water showed a t-count value of 1.418 with a sig of 0.171. Because sig >0.05 indicates no significant difference between the pretest and posttest of giving gambir leaves boiled water with a 95% confidence level and an error rate of 5%. However, the analysis of paired samples correlation test showed a correlation between the results of the observation of urea measurement of 0,549 with sig of 0,008. The results indicate a correlation between the mean of pretest and posttest of giving gambir leaves boiled water, and there is a decrease

Based on descriptive data of the frequency result of observations of the mean of urea for 14 days showed decreased pretest of 24,9 and posttest of 23,09. Based on the data, 14 research subjects experienced a decrease in urea.

Based on the analysis of creatinine data before determining the test to be used, the normality value indicates that the t data is normally distributed. The Shapiro-Wilk value is 0,114 and 0,108 means that the value is >0,05. The analysis test was conducted with the Paired Sample Statistics test. The observation of the mean of creatinine measurement in the pretest and posttest subjects by giving gambir leaves boiled water showed a t-count value of 2.174 with a sig of 0.041. Because sig <0.05 indicates a significant difference between the pretest and posttest of giving gambir leaves boiled water with a 95% confidence level and an error rate of 5%. Likewise, descriptive data of the frequency of observations of the mean creatinine measurement for 14 days showed a decrease in the pretest of 0,8000 and posttest of 0,727. The results are proven by ten research subjects who experienced a decrease in creatinine

Gambir contains alkaloids, tannins, dihydro tannins, oxo tannins, catechins and flavonoids.

The content of gambier can control blood sugar levels so it is good for consumption bydiabetics. The alkaloid content has the function of facilitating the entry of nutrients, in this case blood sugar is entered and processed in body cells. The more cells that process blood sugar, the blood sugar levels can decrease. Alkaloids open the pores of cells as a way to enter the cells as well as a way out of the body's metabolism so that not only helps the processing of blood sugar, the alkaloid content helps the process of eliminating metabolic products from the bodys cells.

CONCLUSIONS AND RECOMMENDATIONS

Gambir leaves (Uncaria gambir) are not effective as traditional medicines to lower blood sugar there was no effect after drinking gambier leaves on levels of SGOT, SGPT, Ureum and creatinine after drinking gambier leaves. Suggestion: Doing clinical research by closely monitoring the research subjects, Can drink gambier leaves as a lowering of SGOT, SGPT, Ureum and creatinine levels.

FURTHER STUDY

Further studies to determine the mechanism, adsorption ability for other dyestuffs, and the role of the components in the extract have not been investigated. In conclusion, further intensive investigations are recommended to explore the molecular mechanism of each component of the extract for its medical uses, and also to investigate more applications of the non-medical uses of U. gambir Roxb.

ACKNOWLEDGMENT

The authors are grateful to RSUD Bangka Tengah and to Poltekkes Pangkalpinang for all research facilities.

REFERENCES

Caprara, G. V., & Zimbardo, P. G. (2004). Personalizing politics: A congruency model of political preference. American Psychologist. https://doi.org/10.1037/0003-066X.59.7.581

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. American Psychologist. https://doi.org/10.1037/0003-066X.55.1.34

Haerani, S., Parmitasari, R. D. A., Aponno, E. H., & Aunalal, Z. I. (2019). Moderating effects of age on personality, driving behavior towards driving outcomes. International Journal of Human Rights in Healthcare. https://doi.org/10.1108/IJHRH-08-2017-0040

Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial literacy among the young: Evidence and implications. National Bureau of Economic Research, 358–380. Retrieved from https://www.nber.org/papers/w15352.pdf

Sabri, M. F., & MacDonald, M. (2010). Savings Behavior and Financial Problems among College Students: The Role of Financial Literacy in Malaysia | Sabri | Cross-cultural Communication. Crosscultural Communication. https://doi.org/10.3968/j.ccc.1923670020100603.009