FARMASAINS: JURNAL FARMASI DAN ILMU KESEHATAN
Volume 4, Nomor 1, 2019. p-ISSN : 2086-3373 | e-ISSN : 2620-987X
https: ejournal.umm.ac.id/index.php/farmasains

Research Article

Clinical study of the efficacy and safety of jamu for hyperuricemia

Agus Triyono[1]*, Fajar Novianto[1]
[1] Balai Besar Penelitian dan Pengembangan Tanaman Obat dan Obat Tradisional, Tawangmangu, Indonesia
* Email: agus_triyono_21@yahoo.com Telp: (+62) 813 2903 8465

ARTICLE INFO

Article History
Received September 14, 2018
Revised November 14, 2018
Accepted April 10, 2019

Keywords
Clinical research
Jamu
Hyperuricemia

Doi
10.22219/farmasains.v4i1.6628

ABSTRACT

Hyperuricemia is a degenerative disease with a reasonably high prevalence and requires long-term treatment. Clinical research has been conducted to test the efficacy and safety of herbal medicine for hyperuricemia. The research involved 30 subjects who had fulfilled the inclusion and exclusion criteria and conducted with a pre-post test research design. Subjects were treated with herbal medicine for hyperuricemia three times a day for 28 days. From the research, jamu for hyperuricemia was effective in reducing blood uric acid levels from 7.43 mg/dL to 5.72 mg/dL, raising the quality of life score (SF-36) from 78.06 to 81.50, and disappeared of clinical symptoms. Use of herbal medicine for hyperuricemia for 28 days in subjects had no symptoms of severe side effects found and did not interfere with liver, kidney, and blood function.

How to cite:Triyono, A., & Novianto, F. (2019). Clinical study of the efficacy and safety of jamu for hyperuricemia. *Farmasains : Jurnal Farmasi dan Ilmu Kesehatan, 4*(1),13-17. Doi: https://doi.org/10.22219/farmasains.v4i1.6628.

INTRODUCTION

Hyperuricemia is a degenerative disease because of purine metabolic disorders. Hyperuricemia is characterized by uric acid blood serum levels more than 7 mg/dL in men and more than 6 mg/dL in women. Hyperuricemia results from increased uric acid production or decreased uric acid excretion or is often both combination (Lamb, Newman & Price, 2006; Singh, Gomez & Swamy, 2010).

Complications of hyperuricemia are gout, uric acid stone, and uric nephropathy. In patients with hyperuricemia, high blood uric acid levels, resulting in the accumulation of monosodium urate crystals in the soft tissue, especially in the joints (Sudoyo, 2006). Hyperuricemia is a metabolic disorder that requires long-term therapy and tends to require a lifetime of treatment. This condition often causes sufferers to get bored with conventional medicine and choose alternative treatments, including traditional medicine (jamu) (Soenarta & Arieska).

Based on the Minister of Health Regulation in 2010, scientification of jamu already implemented, which is a research-based on health services as a breakthrough by the Ministry of Health to build scientific evidence (evidence-based) the efficacy and safety of jamu as herbal medicine (Kementrian Kesehatan Republik Indonesia, 2010).

Jamu for hyperuricemia shows LD50 value > 54,720 mg/kg BW, so it is included in the category of practically non-toxic material. In the subchronic toxicity test, the most significant dose of jamu for hyperuricemia (3,078 mg/200 g BW), which is given

continuously for 90 days does not cause abnormalities in blood, liver, and kidney function (Winarno, Widowati & Sundari, 2015).

In the context for scientification of jamu, which is looking for scientific evidence of the efficacy and safety of jamu for jamu, clinical research studies have been conducted.

RESEARCH METHOD

The raw material used as a simplicia was taken from the Karanganyar area, the determination and management of the simplicia were carried out at the Balai Besar Penelitian dan Pengembangan Tanaman Obat dan Obat Tradisional Tawangmangu. The raw material of simplicia is firstly through the process of material selection and quality control which was carried out by the Quality Control team of the Balai Besar Penelitian dan Pengembangan Tanaman Obat dan Obat Tradisional Tawangmangu.

The jamu material was washed with flowing water to remove the sticking dirt, then air-dried followed by drying in an oven at 50 °C for 7 hours. Simplisia is packaged with a dose of 2 grams of tempuyung leaves (*Sochung arvensis*), 5 grams of secang wood (*Caesalpinia sappan* L.), 3 grams of kepel leaves (*Stelechocarpus burahol*), 3 grams of ginger rhizome (*Zingiber officinale*), 3 grams of turmeric rhizome (*Curcuma domestica* Val), and 3 grams of meniran herbs (*Phyllanthus urinaria*).

Subjects were given jamu, which had been packaged and accompanied by the rules. One package was boiled with 1 Liter of water, and allowed to boil until the water remained about 600 mL, then filtered and drunk three times a day (200 mL). One package for one day, the next day boiling the new packaging, the jamu was taken continuously for 28 days.

This research was conducted using the pre-post test design method. The research involved 30 research subjects who met the inclusion and exclusion criteria.

Subjects who had signed informed consent were taken on D0 for anamnesis, that is the subject's identity; disease history; clinical symptoms; physical diagnostic examination; laboratory examination of blood uric acid levels and hematology; liver and kidney function; and assessment of the quality of life scores with SF-36 questionnaire.

The subject was to re-check once a week for anamnesis, that is complaints, clinical symptoms, possible side effects, and physical diagnostic examination. Blood uric acid levels were examined at D_0, D_{14}, and D_{28}. SF-36 questionnaire, hematology test, SGOT, SGPT, ureum, and creatinine were examined at D_0 and D_{28}.

Table 1. Demographic characteristic of the subject

Characteristic	n (%)
Age	
26—35	2 (6)
36—45	7 (24)
46—55	21 (70)
Sex	
Men	10 (33)
Women	20 (67)
Job	
Student	1 (3)
Army/Police/Government Employees	2 (6)
Private Employees	2 (6)
Entrepreneur	3 (10)
Laborer/Farmere/Fisher	11 (36)
Other	11 (36

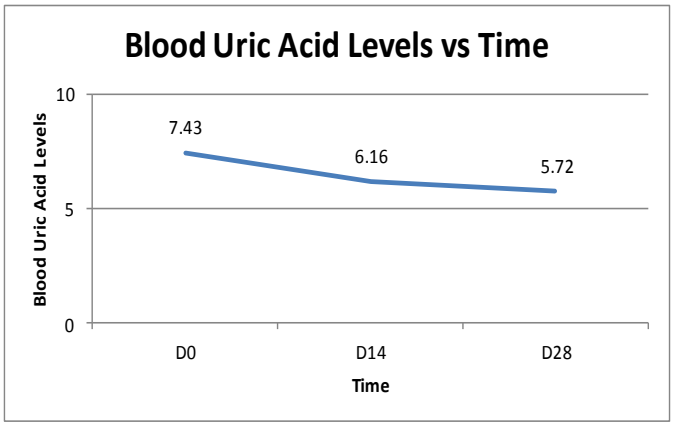

Figure 1. Blood uric acid levels during jamu for hyperuricemia treatment

RESULT AND DISCUSSIONS

From the results of the study (Table 1) shows the most demographic characteristics of the subjects in the age group 46 - 55 years (70%); female (66%); and laborers, farmers, and fishers. Hyperuricemia is a degenerative disease and metabolic disorder with an increased incidence at the age of 46-55 years. In premenopausal and menopausal women, hormonal disorders occur, which can also increase the incidence of hyperuricemia. Laborers, farmers, and fishers are heavy workers, so the possibility of an increase in hyperuricemia and its complications is more exceptional.

Table 2. Time time taken for clinical symptom dissapeared

Clinical Symptom	Day
Pain/swelling in upper limb	23
Pain/swelling in lower limb	22
Rheumatic plain	19
Other complaints	14

Table 3. Quality life score and labaroty test for kidney, liver, and blood function before and after treatment with jamu for hypeuricemia

Score	Average Levels	Before (D_0)	After (D_{28})
SF-36 Score		78.06 ± 11.82	81.50 ± 11.23
SGOT		23.53 ± 10.10	23.70 ± 7.64
SGPT		25.76 ± 13.36	23.03 ± 7.28
Ureum		28.20 ± 7.43	26.80 ± 6.88
Kreatinin		0.97 ± 0.31	0.98 ± 0.31
Hemoglobin	11– 18 g/dL	14.01 ± 1.29	13.80 ± 1.33
Hematocrit	37 - 52 %	43.50 ± 3.41	43.01 ± 3.78
Leukocytes	4 - 10 x $10^3/mm^3$	8.57 ± 1.82	7.94 ± 1.40
Erythrocytes	4 - 5 million/µL	5.17 ± 0.60	5.08 ± 0.45

All subjects showed hyperuricemia as seen from blood uric acid level examination before treatment, with an average value of 7.43 mg/dL. Criteria for hyperuricemia is when blood uric acid levels > 7 mg/dL for men and > 6 mg/dL for women. The usefulness of jamu is based on a decrease blood uric acid levels, improvement in clinical symptoms, that is the disappearance of pain/swelling in extremities, rheumatic pain, and other complaints, as well as an increase in SF-36 scores after treatment.

Jamu treatment for hyperuricemia for 28 days can reduce blood uric acid levels in study subjects 7.43 mg/dL at D_0, to 6.16 mg/dL at D_{14}, and 5.72 mg/dL at D_{28} (Figure 1). From statistical analysis using paired t-test, there is a significant difference ($p < 0.05$) between before (D_0) and after treatment (D_{14} and D_{28}) with $t = 7.013$ (between D_0 and D_{14}) and $t = 7.346$ (between D_0 and D_{28}). These results indicate that the administration of jamu for hyperuricemia effectively reduces blood uric acid levels during 14 and 28 days. A decrease in blood uric acid levels in the subjects is likely due to the influence of the chemical content in the ingredients of jamu, that is secang wood, and tempuyung and Kepel leaves.

Secang wood contains resin, resorcin, brazilin, *d*-alpha phallandren, oscimenen, and essential oils. Secang wood can inhibit the activity of the xanthine oxidase enzyme, which is quite high, thus inhibiting the formation of uric acid. Secang wood inhibits the conversion of hypoxanthine into xanthine thereby inhibiting the formation of uric acid. *N*-hexane, ethyl acetate, and 70% ethanol extract of tempuyung leaves can reduce uric acid levels in hyperuricemia mice (Pertamawati & Hardhiyuna, 2015).

The compounds contained in tempuyung leaves which are suspected of having uricosuric activity are a class of flavonoid compounds. The uricosuric mechanism works by increasing uric acid excretion (Cendrianti, Muslichah & Ulfa, 2014). *N*-hexane extracts 200 mg/kg BW and ethyl acetate extract 200 mg/kg BW kepel leaves (*Stelechocarpus burahol*) reduced levels of uric acid in experimental animals comparable to allopurinol 10 mg/kg BW. Compounds that are suspected of having a uricosuric activity that is flavonoids and terpenoids (Anggraeni, 2013).

Before being given treatment, some subjects experienced clinical symptoms, including pain/swelling of extremities, rheumatic pain, and others. After being treated with jamu for hyperuricemia, the clinical symptoms in the subject disappeared (Table 2). Clinical symptoms disappeared after the administration of jamu for hyperuricemia in subjects was probably due to the influence of the chemical content of turmeric and ginger rhizomes which act as anti-inflammatory and analgesic. Turmeric rhizome has been proven to have analgesic effects on white Wistar strain mice by paw method. Analgesic effect is suspected because turmeric contains active substances such as essential oils and curcumin, which inhibits the cyclooxygenase and lipooxygenase enzymes (Nurwanto, 2013). The ginger rhizome contains curcumin and desmethoxycurcumin, which have anti-inflammatory and analgesic activities that are effective in treating arthritis or rheumatoid arthritis (Afifah & Lentera, 2015).

From the results of the analysis of quality of life scores (Table 3), there was an increase in the SF-36 score, from 78.06 (H0) to 81.50 (H28). An increase in quality of life score indicates an improvement in the subject's quality of life. However, from the statistical results with paired t-test method, there was no significant difference ($p = 0.05$) in the subject's quality of life score between before and after treatment ($t = 0.250$, $p = 0.231$).

The safety of the use of jamu for hyperuricemia during treatment can be assessed from anamnesis and physical examination, as well as the results of laboratory tests of liver function (SGOT and SGPT),

kidney function (ureum and creatinine), and hematological test (hemoglobin, leukocytes, and hematocrit) subjects before and after treatment. The results of anamnesis and physical examination on subjects were not found any significant side effects.

SGOT and SGPT enzymes are serum transaminases that are sensitive to liver cell damage. An increase of twice or more than the average level of SGOT and SGPT enzymes is a sign of liver cell disorders. The increase in these enzymes can be caused by damage to liver cells by herbal formulas or drugs that are toxic to liver cells (hepatotoxic). The average of the SGOT and SGPT examination results before and after treatment (Table 3) were still within average limits (SGOT < 35 IU/L, SGPT < 41 IU/L). From statistical analysis using paired t-test method, there were no significant differences ($p > 0.05$) in SGPT ($t = -0.076$, $p = 0.940$) and SGOT ($t = 1.173$, $p = 0.251$) levels before and after administration of herbal medicine. So the use of herbal medicine for 28 days does not interfere with liver function (McGilvery & Golstein, 1996).

Kidney function can be evaluated by measuring serum urea and creatinine levels. The kidney is an organ that removes fluids from the body and filters substances that are still needed by the body from the plasma. This filtering process takes place in the glomerulus and produces filtrate. Glomerular damage results in decreased glomerular filtration rate (GFR), resulting in an increased level of urea and creatinine, which will endanger the body. The results of examination ureum and creatinine levels before and after treatment with jamu for hyperuricemia are still within average limits (Table 3). From statistical analysis using paired t-test method, there were no significant differences ($p > 0.05$) ureum levels ($t = 1.33$, $p = 0.193$) and creatinine levels ($t = -0.115$, $p = 0.909$) before and after treatment using jamu for hyperuricemia. So the use of jamu for 28 days does not interfere with kidney function.

From the hematological test, the results of statistical analysts using t-test method showed no significant difference ($p > 0.05$) hemoglobin ($t = 0.728$, $p = 0.472$), hematocrit ($t = 467$, $p = 0.522$), leukocytes ($t = 1.884$, $p = 0.070$), and erythrocytes levels ($t = 0.859$, $p = 0.398$) before and after treatment using jamu for hyperuricemia for 28 days.

From these results, it can be concluded that the administration of blood-lowering uric acid herbs until the 28th day does not interfere with liver, kidneys, and blood function.

CONCLUSION

Jamu for hyperuricemia can reduce blood uric acid levels, improve clinical symptoms, and increase the quality of life score (SF-36 questionnaire) in subjects. Besides, jamu for hyperuricemia is proven to have no severe side effects and does not interfere with kidney, liver, and blood function.

REFERENCE

Afifah, E. & Lentera, T. (2003). *Khasiat & manfaat temulawak: rimpang penyembuh aneka penyakit*. Jakarta, Indonesia: Agromedia.

Anggraeni, R. A. (2013). *Uji Aktivitas Antihiperurisemia Ekstrak N-Heksana, Etil Asetat Dan Etanol 70% Daun Kepel [Stelechocarpus Burahol (Bi.) Hook. F. & Th.] Pada Mencit Putih Jantan Hiperurisemia*. (Undergraduate thesis, Universitas Jember, Jember, Indonesia). Retrieved from http://repository.unej.ac.id/handle/123456789/2563.

Cendrianti, F., Muslichah, S., & Ulfa, E. U. (2014). Uji Aktivitas Antihiperurisemia Ekstrak n-Heksana, Etil Asetat, dan Etanol 70% Daun Tempuyung (*Sonchus arvensis* L.) pada Mencit Jantan Hiperurisemia. *Pustaka Kesehatan*, *2*(2), 205-210.

Kementrian Kesehatan. (2010). *Peraturan Menteri Kesehatan Republik Indonesia Nomor: 003/ MENKES/PER/I/2010 tentang Saintifikasi Jamu dalam Penelitian Berbasis Pelayanan Kesehatan*. Jakarta, Indonesia: Author.

Lamb, E., Newman, J, D., & Price, P, C. (2006). Kidney Function Test In C. Burtis., E. Ashwood & D. Bruns (Eds.), *Tietz Textbook of Clinical Chemistry and Molecular Diagnostic 4th edition* (pp. 803-805). Philadelphia, PA: Elseiver Saunders.

McGilvery, R. W., & Golstein, G. W. (1996). *Biokimia Suatu Pendekatan Fungsional Edisi Ketiga*. Surabaya, Indonesia: Airlangga University Press

Nurwanto, A. H. (2013). *Efek Analgesik Dekok Rimpang Kunyit (Curcuma Domestica Val.) Pada Tikus Putih Strain Wistar Dengan Metode Paw Pressure Test*. (Doctoral dissertation, University of Muhammadiyah Malang, Malang, Indonesia). Retrieved from http://eprints.umm.ac.id/28423.

Pertamawati & Hardhiyuna M. (2015). Uji Penghambatan Aktivitas Enzim Xantin Oksidase Terhadap Ekstrak Kulit Kayu Secang (*Caesalpinia sappan* L.). *Kartika : Jurnal Ilmiah Farmasi*, *3*(2), 12-17.

Singh, V., Gomez, V, V., & Swamy, S, G. (2010). Approach to a Case of Hyperuricemia. *Indian Journal of Aerospace Medicine, 54*(1), 40-45.

Soenarta & Arieska. (2005). *Konsensus pengobatan hiperurisemia*. Jakarta, Indonesia: Perhimpunan Hiperurisemia Indonesia.

Sudoyo, A. W. (2006). *Buku Ajar Ilmu Penyakit Dalam Jilid II Edisi IV*. Jakarta, Indonesia: Departemen Ilmu Penyakit Dalam FKUI.

Winarno, M. W., Widowati, L., & Sundari, D. (2015). Studi keamanan ramuan jamu untuk hiperurisemia dan hipertensi. *Buletin Penelitian Kesehatan, 43*(3), 137-146.