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Ethnopharmacy Study of Herbal Medicine as Antihypertension in Simbang District

Selpida Handayani[1*], Abd. Malik[2], Nurul Ilmi Mufidah[1], Risda Waris[1], Virsa Handayani[1], Reski Amriati Syarif[1], Dedy Putra Wahyudi[2]
[1]Bachelor of Pharmacy Study Program, Faculty of Pharmacy, Universitas Muslim Indonesia, Makassar, Indonesia
[2]Capture Fisheries Study Program, Faculty of Animal Husbandry and Fisheries, University of West Sulawesi, Indonesia

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***Email:**
selpida.handayani@umi.ac.id

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Abstract
Empirically, the Indonesian people have used medicinal plants to cure various diseases. Ethnopharmaceutical studies were carried out as an effort to maintain knowledge of medicinal plants in the community, especially in Simbang District. This study aims to obtain data and information related to medicinal plants used as antihypertensives by the community in Simbang District, Maros Regency. This study was a survey study using a descriptive observational method where sampling uses purposive sampling techniques through interviews and questionnaire distribution. The results obtained were 17 species, 15 families, and 16 genera that were used as antihypertensives. Plant parts used as antihypertensives were leaves, fruits, seeds, rhizomes, and tubers. The way to use antihypertensive medicinal plants in the community in Simbang District was to be eaten and drunk by processing boiled, brewed, grated, and ground.

I. Introduction

It is undeniable that most Indonesian people have used medicinal plants to cure any disease. The way to use traditional medicine insights is mostly carried out orally, so the influx of new (modern) knowledge raises a sense of fear of the loss of the views of indigenous people in an area regarding traditional medicine. Therefore, the importance of an effort to maintain knowledge about traditional plants through ethnopharmaceutical studies (Amin et al., 2020). Nowadays, people's desires related to traditional medicine are growing, and this is motivated by conformity when using traditional medicine (Saranani et al., 2021).

Hypertension is a health problem quite high in the world. According to World Health Organization (WHO) data (2015) shows prevalence. Hypertension occurs in the age group adults aged ≥ 25 years is about 40%. Hypertension is predicted to cause death which is about 7.5 million and the cause of death in the world which is about 12.8%. As for the United States It is estimated that 33.8% of the population suffers from it hypertension that occurs in males nor women. As for Indonesia, prevalence hypertension sufferers according to the Ministry of Health i.e. there are about 31.7%, of which only 7.2 of 31.7% of the population has understanding regarding hypertension and there are events that taking hypertension medication only about 0.4% (Ainurrafiq et al., 2019).

Based on RISKESDAS data in 2018, the prevalence of hypertension in the population over 18 years according to national assessments was increased by 34.11% compared to the prevalence in 2013 of 25.8% (Saranani et al., 2021). The prevalence of hypertension based on measurement results according to districts/cities in South Sulawesi Province to be precisely in Maros Regency obtained data as much as 27.41% (Riskesdas, 2018). The data showed that people with hypertension in Maros Regency are relatively high. Simbang Subdistrict consists of 6 villages where the BPS (a central statistic bureau of Maros Regency in Simbang District in 2020 Figures) reported that there are no general practitioners in this area. There are only 10 midwives and the rest are birth attendants.

II. Research Method

II.1 Place/Location and Time of Research

This research was carried out in Simbang District, Maros Regency, South Sulawesi Province. The study was conducted from November 2021 to February 2022.

II.2 Research Type

The type of research was a survey using observational methods.

II.3 Determination of Samples/Respondents

The sampling method of the study was *the purposive sampling method. Purposive sampling* was carried out based on the determination of certain criteria (Mukhsin et al., 2017). The population used in this study was a native of Simbang District, Maros Regency, South Sulawesi Province who had knowledge related to medicinal plants used as antihypertensives. The determination of the number of samples in this study used the *slovin formula*, which is as follows Formula 1.

$$n = \frac{N}{1+N.\ e^2} \quad (1)$$

Information: n = Number of Respondents; N = Population Size; e = Percentage of sampling errors that can still be tolerated (Septianingsih & Subiyanto, Kusuma Chandra Kirana, 2020).

The population in Simbang Subdistrict is 24.019 people consisting of 11.614 men and 12.405 women.

$$n = \frac{24.019}{1+24.019\ .\ (0,2)^2}$$

$$n = \frac{24.019}{1+24.019\ .\ 0,04}$$

$$n = \frac{24.019}{961,76}$$

$$n = 24.974$$

$$n = 25$$

Based on the calculations, the number of samples in this study was 25 respondents.

II.4 Research Procedures

II.4.1 Questionnaire form (Interview Guidelines)

The questionnaire is a document or research instrument that contains several questions that are arranged systematically. It will be asked to respondents to obtain data from respondents where the data then becomes information to answer research objectives. The contents of the questionnaire contained the identity of the informant and the use of traditional medicine which includes the name of the plant (Indonesian/local), the part used, how to process, how to use, and the rules of use.

II.4.2 Questionnaire dissemination

The researcher will distribute the questionnaire to the respondents and accompany the respondents when filling out the questionnaire to explain if the respondent's experienced difficulties when filling out the questionnaire. If the respondent is unable to fill out the questionnaire on the spot, the questionnaire will be left for some time and will be taken back if it has been filled out by the respondent.

II.4.3 Questionnaire collection

The questionnaire is collected immediately after the respondent has finished filling out the questionnaire, for questionnaires that are left for some time, the questionnaire will be taken to be collected if it has been completed by the respondent. The number of questionnaires collected is equal to the number of questionnaires distributed.

II.4.4 Interview

An interview is a method of collecting information related to the treatment of traditional medicinal plants by asking questions orally to then be answered orally as well.

III. Results and Discussion

The study was performed in 6 villages in Simbang District, Maros Regency, South Sulawesi Province including Bontotallasa, Tanete, Jenetaesa, Samangki, Sambueja, and Simbang villages. The study was conducted on 4 selected respondents representing 5 villages and 5 selected respondents representing 1 village that met the inclusion criteria so that the total number of respondents was 25 people from the Bugis-Makassar tribe.

The respondents chosen who have knowledge and experience related to the use of medicinal plants that were efficacious as antihypertensives. On the other hand, people who had a history or were suffering from hypertension were also included. Respondents were selected based on observations/surveys through community leaders or officials who were considered to have knowledge related to the condition of the community or residents in Simbang District, Maros Regency while still considering the established inclusion and exclusion criteria.

Based on the results of the study, 17 species of ethnopharmaceutical plants were obtained that are efficacious as antihypertensives used by the community in Simbang District, Maros Regency. The results obtained from filling out questionnaires and interview activities in the data used descriptive statistical data where plants were classified were then presented in the form of tables.

The list of medicinal plants used as antihypertensives by the community in Simbang District, Maros Regency includes plant parts, forms of presentation, how to use and process, rules of use, and duration of use can be seen in **Table 1**.

The classification of medicinal plants based on the availability of experimental data can be seen in **Table 2**.

Table 1. List of antihypertensive medicinal plants in Simbang District, Maros Regency

No.	Regional name / Indonesia	Plant parts	Forms of presentation	How to use and How to Process	Rules of use	Duration of Use
1.	Bidara	Leaf	Single	Young leaves are boiled whole and then drunk	1x a day as much as 2 cups before meals	Until the perceived symptoms disappear
2.	Bainang / star fruit	Leaves and Fruits	Single	Whole young leaves are boiled or after coarse chopping and then drunk. Young fruits are consumed directly	1x a day as much as 1 cup or 2-star fruit before meals	Until the perceived symptoms disappear
3.	Soursop	Leaf	Single	Whole young leaves are boiled and then drunk	1x a day as much as 1 cup before meals	For 2 weeks or half a month
4.	Tangings / papaya	Leaf	Single	Whole young leaves are boiled and then drunk	1x a day as much as 1 cup before meals	Until the perceived symptoms disappear
5.	Samburoto / sambiloto	Leaf	Herb	Whole young leaves boiled added honey then drunk	1x a day as much as 1 cup after meals	Until the perceived symptoms disappear
6.	Gerseng / Kersen	Leaf	Single	Whole young leaves are boiled and then drunk	1x a day as much as 1 cup before meals	Until the perceived symptoms disappear
7.	Lekosso' / Celery	Leaf	Single	Pounded young leaves	1x a day as much as 1 cup after meals	For 1 week
8.	Greeting	Leaf	Single	Whole young leaves are boiled and then drunk	3x a day as much as 1 cup before meals	Until the perceived symptoms disappear
9.	Mahogany	Seed	Single	Ripe mahogany fruit seeds are consumed directly	1x a week as much as 1 piece after meals	For 1 Month
10.	Kunyi' / turmeric	Rhizome	Single/herb	Whole rhizomes are grated then boiled/brewed and then drunk or added to honey	2x a day as much as 2 cups before or after meals	Until the perceived symptoms disappear
11.	Chlorophyll Leaves	Leaf	Single	Whole young leaves are brewed and then drunk	1x a day as much as 1 cup	Until the perceived

					after meals	symptoms disappear
12.	Lobe-lobe/Ceremai	Leaf	Single	Whole young leaves are boiled and then drunk	1x a day as much as 1 cup after meals	For 1 week
13.	Sarikaya/Serikaya	Leaf	Single	Whole young leaves are boiled and then drunk	2x a day as much as 2 cups before meals	For 2 weeks or half a month
14.	Moringa	Leaf	Single	Whole young leaves are boiled and then drunk	1x a day as much as 1 cup after meals	Until the perceived symptoms disappear
15.	Bonte' / Cucumber	Fruit	Single	cucumbers are consumed directly	1x a week as much as 1 piece after meals	Until the perceived symptoms disappear
16.	Baya' / Holiness	Fruit	Single	Ripe fruit is cleaned of seeds and then mashed and consumed	1x a day as much as 1 piece after meals	Until the perceived symptoms disappear
17.	Lasuna Kebo' / Garlic	Tuber	Herb	Garlic is mashed and then boiled with other medicinal plants such as soursop leaves	2x a day as much as 2 cups before meals	Until the perceived symptoms disappear

Table 2. Classification of medicinal plants that have passed both experimental and non-experimental testing as antihypertensives

No.	Species	Indonesian Name/Region	Experimental	Non-Experimental
1.	*Ziziphus mauritiana* Lam.	Bidara		✓
2.	*Averrhoa bilimbi* L.	Star fruit/Bainang	✓	
3.	*Annona muricata* L.	Soursop	✓	
4.	*Carica papaya* L.	Papaya/Tanging-Tanging	✓	
5.	*Andrographis paniculata* (Burm. f.) Wall. ex Nees	Sambiloto/Samburoto	✓	
6.	*Muntingia calabura* L.	Kersen/Gerseng		✓
7.	*Apium graveolens* L.	Celery/Lekosso,	✓	
8.	*Syzygium polyanthum*	Greeting	✓	
9.	*Swietenia mahagoni* (L.) Jacq	Mahogany	✓	
10.	*Curcuma longa* L.	Turmeric/Kunyi'	✓	
11.	*Gymnanthemum amygdalinum* Sch.Bip.ex.Walp	Chlorophyll Leaves		✓
12.	*Phyllanthus acidus* (L.)	Ceremai/Lobe-Lobe		✓
13.	*Annona squamosa* L.	Serikaya/Sarikaya	✓	
14.	*Moringa oleifera* Lam.	Moringa	✓	
15.	*Cucumis sativus* L.	Cucumber/Bonte'	✓	
16.	*Morinda citrifolia* L.	Holiness/Baya'	✓	
17.	*Allium sativum* L.	Garlic/Lasuna kebo'	✓	

The use of medicinal plants as an alternative is because effectivity such as cheaper and easier to obtain. People who use medicinal plants as primary health care argue that medicinal plants are closely related to safety and naturalness and they are related to the preservation of the original knowledge system that has been passed down from generation to generation (Afifah et al., 2021). This is similar to the principle of using medicinal plants by the community in Simbang District, the use of medicinal plants is a tradition that has been carried out for generations.

People in Simbang Subdistrict use medicinal plants as their first choice when suffering from diseases including hypertension because of the ease of processing and how to obtain it. The use of folk remedies is also more economical and has minimal side effects. Many types of medicinal plants are used singly as well as herbs (Tandi et al., 2020). From the results of filling out questionnaires and interviews, 17 species and 15 ethnopharmaceutical plant families from 3 tribes in a total of 25 respondents, namely the Bugis, Makassar, and Bugis-Makassar tribes in Simbang District, Maros Regency, 25 respondents each represented 6 villages in Simbang District, namely Samangki, Tanete, Bontotallasa, Jenetaesa, Sambueja, and Simbang.

The part of the plant that is more widely used by the community in Simbang District as an antihypertensive is the leaves. This is because leaves are parts of plants that can be obtained easily in large quantities, and there are no restrictions on availability as well as fruits are generally available at certain times, besides that leaves are also easy to clean and easy when process (Rumi et al., 2021). The processing and use of medicinal plants used by the community in Simbang District vary including boiled, ground, coarsely chopped, brewed, grated, or consumed directly. Because people in Simbang District use more leaves so that in their use and processing, most of them are drunk after boiling where generally people boil with a dose of 2 cups until they are left to 1 cup. The reason for processing using the boiling method is because this method can attract active compounds on the leaves and is easy to do (Rumi et al., 2021).

The frequency of use of medicinal plants used as antihypertensives by people in Simbang District is more than only consumed 1 time a day or 1 time a week, based on the results of the interview, it is because there are concerns that if consumed too often it will make blood pressure very low. As for the duration of use of antihypertensive medicinal plants based on the results of interviews with 25 respondents, respondents revealed that the use of these medicinal plants was only until the symptoms felt from hypertension had disappeared, then respondents would stop taking them if the symptoms of hypertension were no longer felt. Generally, respondents took antihypertensive medicinal plants for no more than 3 months. Some respondents will re-examine their blood pressure at a health facility if the symptoms felt after using the medicinal plant have disappeared.

Empirically, the plants used as antihypertensives by the community in Simbang District are Bidara *(Ziziphus mauritiana* Lam*)*, Star fruit *(Averrhoa bilimbi* L.*)*, Soursop *(Annona muricata* L.*)*, Papaya *(Carica papaya* L.*)*, Sambiloto *(Andrographis paniculata* (Burm. f.) Wall*)*, Kersen *(Muntingia calabura)*, Celery *(Apium graveolens* L.*)*, Salam *(Syzygium polyanthum)*, Mahogany *(Swietenia mahagoni* (L.) Jacq*)*, Turmeric *(Curcuma longa* L.*)*, Chlorophyll (*Gymnanthemum amygdalinum* Sch.Bip.ex.Walp), Ceremai *(Phyllanthus acidus* L.*)*, Srikaya *(Annona squamosal* L.*)*, Moringa *(Moringa oleifera* Lam.*)*, Cucumber *(Cucumis sativus* L.*)*, Mengkudu *(Morinda citrifolia* L.*)*, Garlic *(Allium sativum* L.*)*.

Based on the data obtained in table 2, of the 17 species of antihypertensive medicinal plants, 4 medicinal plants have not been found in experimental studies related to testing the antihypertensive effect both testing on humans and animal models. Medicinal plants that have not been found in experimental testing are Bidara *(Ziziphus mauritinia* Lam.*)*, Kersen *(Muntingia calabura* L.*)*, Chlorophyll Leaves *(Gymnanthemum amygdalinum* Sch.Bip.ex.Walp*)* and Ceremai *(Phyllanthus acidus* L.*)*. However, the 4 medicinal plants that have not passed the experimental test have the same chemical content as the other 13 antihypertensive medicinal plants that have passed experimental testing. So all medicinal plants obtained from this study each have the same chemical content that can act as an antihypertensive. In the discussion that has been carried out, it can be concluded that the most chemical content found in antihypertensive medicinal plants in Simbang District, Maros Regency is flavonoids, alkaloids, saponins, tannins, steroids, potassium, and phenolics. In addition to these chemical contents, each medicinal plant also has certain other chemical contents that play a role in reducing blood pressure.

IV. Conclusions

Based on the results of the study, it was concluded that the people in Simbang District still maintain a culture regarding ethnopharmacy of antihypertensive medicinal plants.

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