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ETHNOBOTANICAL SURVEY OF MEDICAL PLANT USED FOR THE TREATMENT OF HYPERTENSION IN SUBULUSSALAM SUB-DISTRICT ACEH, INDONESIA

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui jenis tumbuhan, bagian, cara penggunaan dan pemanfaatannya untuk obat penyakit hipertensi pada masyarakat di Rundeng Kota Subulussalam. Pengumpulan data dilakukan dengan wawancara dan observasi. Analisis data dilakukan secara deskriptif yaitu data dalam bentuk tabel. Hasil penelitian menemukan 22 jenis tumbuhan yang terdiri dari 21 genus, 18 famili sebagai obat hipertensi yang digunakan oleh masyarakat di Rundeng Kota Subulussalam. Bagian tumbuhan yang digunakan sebagai obat hipertensi adalah seluruh bagian organ tumbuhan, dengan bagian daun merupakan bagian yang paling banyak digunakan. Cara penggunaan yang paling dominan adalah dengan cara direbus, di-*blender* lalu airnya diminum. Cara pemanfaatan tumbuhan untuk obat hipertensi yang paling dominan yaitu dengan cara diminum dan dimakan sebagai lalapan.

Kata Kunci: Hipertensi, tumbuhan obat, Subulussalam.

ABSTRACT

This research is intended to know the types of plants, parts, preparation and its use for hypertension therapy in the community in Rundeng of Subulussalam City. Data collection is done by interview and observation. Data analysis was done descriptively in table form. The results of the study found 22 species of plants, consisting of 21 genus, 18 families as hypertension drugs used by the community in Rundeng of Subulussalam City. The plant parts that are used as hypertension drugs are all parts of plant organs, with the leaves as the most widely used parts. The most dominant preparation way is by boiling, blend it in a blender and then drink the juice. The most dominant way to consume plants for medicine is by drinking the juice and eating it as fresh vegetables.

Keywords: Hypertension, medical plants, Indigenous knowledge, Subulussalam.

INTRODUCTION

Hypertension is a condition where blood pressure in the arteries increases. Someone is said suffering from high-pressure disease when the systolic blood pressure above 140 mm Hg and diastolic above 90 mm Hg [1]. The only way to know hypertension is to measure our blood pressure regularly. It is known that 9 out of 10 people suffering from hypertension cannot identify the cause of the disease. Hypertension is dubbed the "*silent killer*", because it is a deadly disease without being accompanied by its first symptoms for the victim [2]. "Hypertension opens up 12 times more chances to suffer a stroke, 6 times greater for heart attack, and 5 times more likely to die of heart failure (*congestive heart failure*). The hypertensive sufferers are also at greater risk of suffering kidney failure. In Indonesia, an estimated 64 million people aged 18 to 75 years suffer from hypertension [3].

Based on its cause, hypertension can be classified into essential/primary hypertension and secondary hypertension. The cause of primary hypertension is still unknown. However, age aging, stress, and heredity are the triggers. Approximately 90% of hypertensive patients classified as primary hypertension, while 10% belong to secondary hypertension [2].

Secondary hypertension is a known cause of hypertension, thyroid gland disorders (*Hyperthyroid*) and adrenal gland disease (*Hyperaldosteronism*). The largest group of people with hypertension belongs to primary hypertension, so more investigation and treatment are proposed for people with primary hypertension [4].

One way to treat hypertension is by herbal therapy [5], because the natural medicine is believed to be able to cope with various diseases with a relatively high level of security. In addition, herbal remedies are easier to consume and easily obtain around us [2], with the ability to treat the disease as effective as pharmaceutical drugs, without significant side effects. The lack of herbal remedies usually is the dose or inaccurate use. Nevertheless, in many developed countries nowadays, herbal remedies are prescribed by

doctors, prepared and sold through pharmacies.

The presentation of special herbal medicines in hypertension therapy is presented in several ways, for example by eating directly, served as juice, processed into dry herbs or food as a complement to the daily menu.

The Aceh Province is a tropical region that has a variety of plants that can be used as an alternative medicine for various diseases. The utilization of medicinal plants is still considered important for the people of Aceh, especially the people of Subulussalam City. Their knowledge of medicinal plants comes from parents and traditional healer. Heritage of knowledge and recording by herbal users certainly have important value and meaning for community today [6].

The Subulussalam city is divided into five sub-districts, one of which is Rundeng sub-district, which still has limited health facilities. Rundeng sub-district is also known as "Leaf Village" which means medicine village. Rundeng people still use plants as herbal medicine to treat various diseases, such as hypertension. The initial observation and interviewing with residents with hypertension showed that they still consume specific plants as a medicine. In this area, there are various medicinal plants that are deliberately planted in residential areas. The reason people choose to consume easy medicinal plants for the residence,

The knowledge was carried from generation to generation from their parents with important role of a healer. The healer is a person who has knowledge in diseases, and knowledge of medicinal plants regarding thode diseases.

Research on hypertension medicine plants in Rundeng of Subulussalam City is important to do considering the daily use of medicinal plants to treat hypertension. Therefore, it is necessary to conduct the research aimed at the treatment of hypertension, the part of plants used and the way of processing and its use as a remedy for healing hypertension.

MATERIALS AND METHODS

Study locations

The survey was conducted in Rundeng of Subulussalam City, Aceh Province. In general, Subulussalam

City has a tropical climate with an average rainfall of 3,213 mm and an average temperature of 26.4 ° C. The driest month is June, with 172 mm of rain).

The sub-district Rundeng has an area of 369 km2 with a total of 23 villages. The survey was conducted in 10 villages: Siperkas, Oboh, Sibungke, Dah, Sibuasan, Tualang, Tanah Tumbuh, Kuala Kepeng, Sepadan, dan Suak Jampak.

The reason for choosing the 10 villages, because it is far from the center of the village, so there is lack of health facilities.

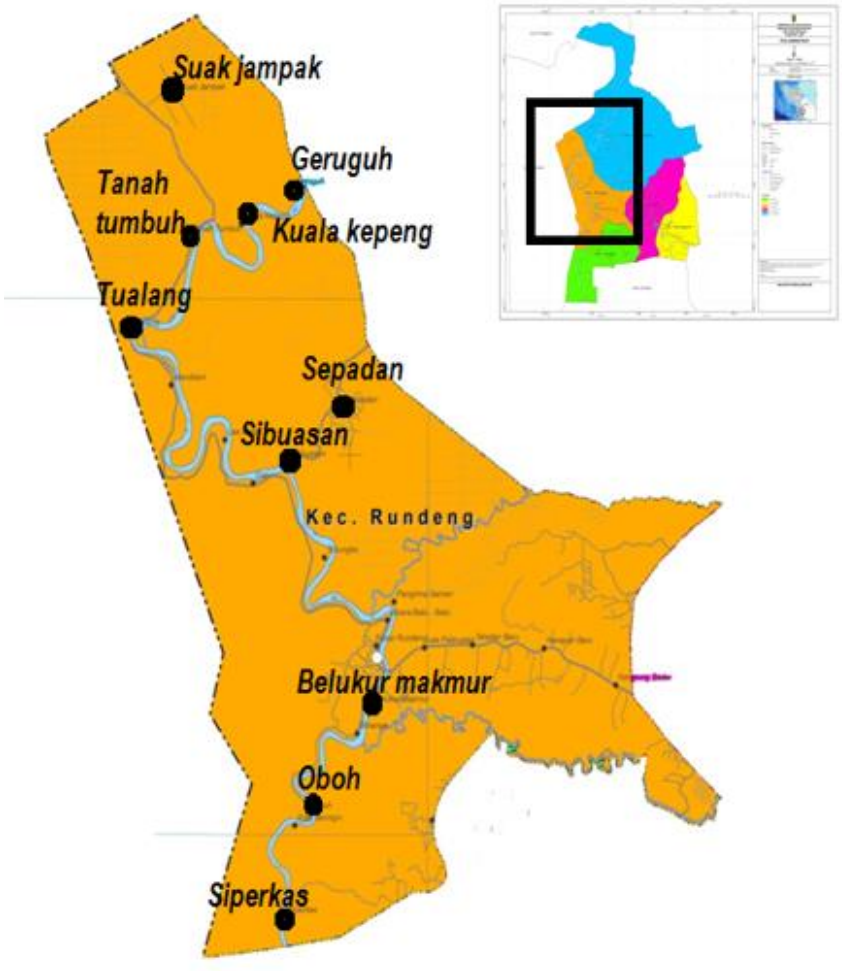

Figure 1 Study Locations Map (Source: BPS Subulussalam City, 2016)

Data Sources

Sources of data in this study are people with hypertension and village healer. Consideration for determining data and data sources is the location

and category of hypertension community and village healer existing in each village show in Table 1.

Table 1. Sources of Research Data

No	Village	Total (People)		Total of Patients by Tribe (People)			
		Patients with Hypertension	Healer	Pak-pak Boang	Pak-pak Dairi	Jawa	Aceh
1	Siperkas	2	1	3	-	-	-
2	Oboh	18	1	19	-	-	-
3	Belukur Makmur	17	1	14	-	2	2
4	Sibuasan	11	1	11	-	-	-
5	Sepadan	14	1	4	-	10	-
6	Geruguh	16	1	16	-	-	-
7	Tualang	21	1	20	1	-	-
8	Tanah Tumbuh	17	1	17	-	-	-
9	Kuala Kepeng	5	1	4	1	-	-
10	Suak Jampak	8	1	3	-	-	5
Total		**129**	**10**	**117**	**2**	**12**	**7**

Source: Puskesmas Rundeng (2016)

Based on Table 1, the number of data sources in this study is the total of patients with hypertension plus the total of healer in each village with a total of 139 people.

Technique for Collecting Data

The data was collected with interview and observation. Interviews were conducted directly with people with hypertension and healer by asking a number of written questions that have been prepared. The observation is done to know the things related to the object of research which are type of plants used by people who suffer from hypertension in Rundeng sub district of Subulussalam City.

Data Analysis

Data analysis in this research is done descriptively that is data is presented in table form. The table contains information about the species name, familia, part of the plant used, how to process, and how to use the medicinal plants. The photo observation are in the form of photo of species used by the community to treat hypertension.

RESULTS AND DISCUSSION

Social Economic of the Society in Rundeng Subulussalam City

The society as research subjects at Rundeng sub district of Subussalam City were 139 respondents, consisting of 129 people with hypertension (92,81%) and 10 healer (7,19%). The education level of respondent is graduate of elementary school 59 people (42,44%), junior high school 41 people (29,49%), graduate high school 19 person (13.66%) and graduate of Diploma and Bachelor 3 person (2,16%), while 17 people did not complete formal school (12.23%). However, all respondents can read.

Respondents consisted of 82 were male and 57 female from 4 tribes: Pak-Pak Boang 117 people (84.17%), Pak-Pak Dairi 3 people (2.16%), Javanese 12 people (8.63), and Acehnese 7 people (5.03 %). The age of the respondents varied widely, from 35 years to 66 years, with details: age 35-40 years, 17 people (12.23%), 40-45 years, 39 people (28.06%), age 46-50 years 24 people (17.27%), and age >50 years were 59 people (42.45%).

Hypertension number [2] "One of the men aged between 35 to 44 years suffering from hypertension. The number is doubled in age between 45-54 years. Half of people of 55-65 years old have this disease. At the age of 65-74 years, the prevalence become higher, which is about 60%. In terms of respondents' work, most are farmers (63.20%), self-employed (12%), housewives (9%), civil servants (10.2%), and laborers (5.6%).

Type of Plant for Healing Hypertension in Rundeng Subulussalam

Various reasons can elicit in diseases, such as hypertension. Some efforts are made to cure this disease. One of them is by using medicinal herbs that are believed to improve the condition of people with the disease. Herbal medicine has the ability to improve the body's bio molecular activity [7]. This ability exists because the plant can perform a biosynthesis combination of its secondary metabolite compounds. Herbal remedies can increase and improve the expression of genes in the body. As gene expression increases and becomes better, the body's hormones and immune systems will work more optimally [8], [9].

The results of the study found that people in sub-district Rundeng of Subulussalam City still use many plants as a medicine for healing hypertension. The results of the study showed that there are 18 families used in hypertension therapy, i.e. Lauraceace, Asteraceae, Oxalidaceae, Amaranthaceae, Solanaceae, Rutaceae, Muntingiaceae, Zingiberaceae, Liliaceae, Rubiaceae, Euphorbiaceae, Cucurbitaceae, Pandanaceae, Mackinlayaceae, Myrtaceae, Caricaceae, Apocynaceae, Lauraceae, and Annonaceae.

Types of medicinal plants used as hypertension remedies are 22 species consists of 21 genus. Type of plant used as hypertension remedies are shown in Table 2.

Table 2. Types of plants for healing hypertension in Rundeng, Subulussalam City

No	Medicinal Plants for Hypertension	Village										Total
		T	**Tu**	**B**	**Sb**	**Sp**	**O**	**Spk**	**K**	**G**	**SJ**	
1	*Apium graviolens L.*	2	1	2	2	2	2	1	2	2	1	17
2	*Vernonia amygdalina* L.	4	6	5	1	5	3	0	1	3	2	30
3	*Averrhoa carambola* L	3	1	1	0	1	3	0	0	0	1	10
4	*Averrhoa balimbi* L.	3	4	3	1	4	3	2	1	1	2	24
5	*Lycopersicum esculentum L.*	0	0	0	0	0	1	0	0	0	0	1
6	*Cinnamomum cassia* Presl.	2	3	1	2	2	3	0	1	1	1	16
7	*Citrus aurantifolia* Christm.) Swing)	0	1	1	1	1	1	0	0	0	1	6
8	*Muntingia calabura* L.	1	2	0	0	1	1	0	1	0	0	6
9	*Curcuma domestica* L.	1	0	2	3	2	1	0	0	0	1	10
10	*Aloe vera* L.	0	0	1	1	1	0	0	0	2	0	5
11	*Morinda citrifolia* L.	5	5	3	4	1	5	2	1	6	2	34
12	*Phylanthus niruri* L.	2	3	4	2	2	5	1	1	3	2	25
13	*Cucumis sativus* L.	4	4	6	4	3	2	1	2	5	1	32
14	*Pandanus amaryllfolius* Roxb	0	2	3	2	1	2	0	0	2	1	13
15	*Centella asiatica* L.	6	4	3	2	3	3	0	1	2	3	27
16	*Carica papaya* L.	0	2	2	1	0	1	1	0	0	1	8
17	*Syzygium polyanthum* Wigh Walp.	1	3	2	1	3	2	0	1	5	1	19
18	*Ixora stricta* Roxb.	0	0	1	2	0	0	0	1	0	1	5
19	*Annona squamosa* L.	2	7	2	1	1	3	1	2	1	2	22
20	*Cantharanthus roseus* L G. Don	0	1	4	2	1	2	0	1	0	1	12
21	*Alium sativum* L.	0	1	2	0	1	1	1	0	0	0	6
22	*Andrographis paniculata Hess.*	2	2	1	2	3	4	2	1	1	1	19

Explanation: T = Tanah tumbuh, Tu = Tualang; B = Belukur; Sb = Sibuasan; Sp = Sepadan; O = Oboh; Spk = Siperkas; K = Kuala kepeng; G = Geruguh; and SJ = Suak Jampak.

Types of plants used as hypertension medicines in all tribes in Rundeng Subulussalam are: Seledri (*Apium graviolens*), Belimbing (*Averrhoa balimbi*), Kayu manis (*Cinnamomum cassia*), Mengkudu (*Morinda citrifolia*), Meniran (*Phylanthus niruri*), Timun (*Cucumis*

sativus), Sirsak (*Annona muricata*) and Sambiloto (*Andrographis paniculata* Hess.). All of these plants are very easy to find in Rundeng Subulussalam City. Ciplukan, Meniran, and Sambiloto are herbs that can grow anywhere, while Seledri, Belimbing, Mengkudu, Timun dan Sirsak are widely grown in the yard of the house or in the garden.

Seledri/celery (*Apium graveolens*) has long been used to lower high blood pressure and can be used in juice form. Celery contains flavonoids, saponins, tannins, and essential oils. It effective as a tonic that can stimulate digestive enzymes, lower blood pressure (hypotensive), improves the function of the hormone and cleans the blood. To use for hypertension is 5 stalks of celery blended and drink twice a day.

Sirsak/starfruit (*Averrhoa balimbi*) has chemical content of tannins, calcium oxalate, sulfur, formic acid, potassium citrate, linoleic acid, and peroxidase. Linoleic acid can lower high blood pressure, because it can normalize the lack of prostaglandin E series in the body. For the treatment of hypertension, 3 starfruit are washed and cut into pieces, then boiled with 3 cups of water until remain 2 cups of water. After chilling, it is filtered and drunk 3 times a day.

Mengkudu/noni (*Morinda citrifolia*) is the most widely used medicinal plant. This is because the fruit is very easy to find. This fruit is one type of medicinal plants that have the property to lower high blood pressure and lower blood sugar levels in the body. The noni fruit contains: acubin, morinda diol, caprylic acid, soranyidiol, L. asperuloside, alizarin, and some anthraquinone, ascorbic acid, scopoletin, xeronine and proxeronine [10], [11]. The substance that work in overcoming high blood pressure disease is Scopoletin, that plays a role in dilation of blood vessels that have narrowing. In addition, these substances are anti allergic, anti-inflammatory and can kill the fungus *Phitium* sp. [12]. Its use for high blood sufferers is by boil young fruit and eaten as a salad. If taken as juice, 2-3 grated fruit is blend and done 2 - 3 times a day. It can also be mixed with cucumber juice.

Kayu manis/cinnamon (*Cinnamomum cassia*) is planted in the garden or yard of the house. The skin of this plant contains cinnamic aldehyde, cinnamyl acetate, tannin,

saffrol, and phenylpropyl. Its fruit contains caoumarin, trans-cinnamic acid, beta sitosterol, and cholin [6], [13]. Utilization for hypertension is by brewing the cinnamon bark pulp with warm water, drink 2 times a day.

Meniran (*Phylanthus niruri*) is a herbaceous plant and grows wild on moist soils. Meniran contains: lignin, flavonoids, alkaloids, triterpenoids, fatty acids, vitamin C, potassium, tannins, phyllanthin, and hypophyllanthin [6]. Its use in hypertension therapy is done boiling dried plants, then drink the water 3 times a day after meals.

Cucumber (*Cucumis sativus*) is a creeping herbaceous plant of season, with tendrils at the side of the petiole and cultivated in the community. Cucumbers contain bitiin C, stigmasterol, glutathione, vitamin B and C [12], [14]. Utilization of cucumber for the treatment of hypertension is by blending the cucumber fruit and drink it 2 times a day. The therapy can also be done by eating the young fruit directly.

Sirsak (*Annona muricata)* is an annual plant that has various benefits. Srikaya contains: flavonoids, saponins, tannins, polyphenols, and alkaloids [15]. The use for hypertension remedies is by boiling the leaves and drinks the water 3 times a day.

Plant Part Used as Hypertension Medicine at Rundeng Subulussalam

The parts of plants used as a cure for healing hypertensive disease is all parts of the plant consisting of roots, leaves, stems, fruits, seeds, flowers and rhizomes. Part of medicinal plants used for the cure of hypertension disease is shown in Figure 2.

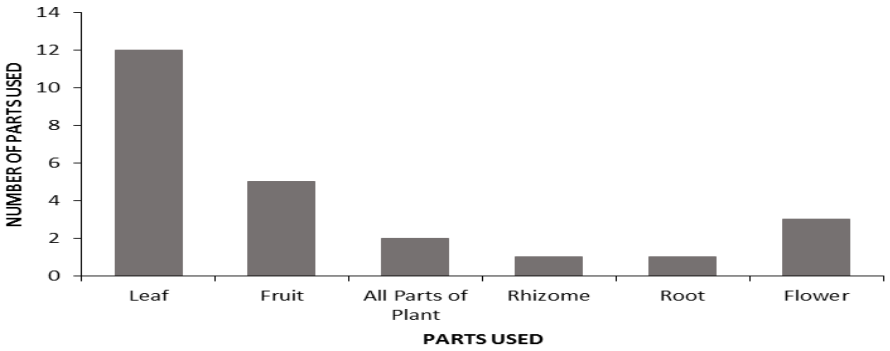

Figure 2. Part of the Plant Used as Hypertension Drug in Rundeng Subulussalam.

Based on Figure 2, it can be seen that the most widely used plant part of society Rundeng Subulussalam as hypertension drug is the leaf. Leaves are the most easily obtained parts of plants compared to other parts. Various kinds of leaf proven to treat diseases, such as breadfruit leaves, moringa leaves, soursop leaf, binahong leaf, red betel leaf, god leaf, papaya leaf, pegagan leaf, and bay leaf [16].

Previous studies showed some of medicinal plants that use the leaves such as African, pegagan, starfruit, soursop, bay leaf, pandan, tapak dara, avocado, papaya, lemon, cherry, and aloe vera [17], [18]. The study explains that the leaves are parts of plants that are widely used as traditional medicine because the leaves are generally soft because it has high water content (70-80%). In addition, the leaf is a place of accumulation of photosynthia, organic substances that have the nature of curing diseases. Substances that are widely found in the leaves are essential oils, phenols, potassium compounds and chlorophyll. Chlorophyll is a substance that is widely present in green plants such as *Amaranthus tricolor* L.

Medicinal plants that use all parts of plants are Boroco and Meniran. Medicinal plants that use the fruit part are starfruit, cucumber, mengkudu, sweet starfruit, and lime. Medicinal plants that use the root part are ciplukan. Plants that use the flower are lemon and siantan, while plants that use the rhizomes is turmeric [19].

The way to Process Hypertension Medicinal Plants in Rundeng Subulussalam

The way to treat medicinal plants by people in Rundeng Subulussalam for healing hypertension disease is mostly done by boiling and blending. How to treat medicinal plants for healing hypertensive diseases shown in Figure 3.

Figure 3 shows that the process medicinal plants conducted by the community in Sub District Rundeng of Subulussalam City for healing hypertensive disease is mostly done by boiling and the rest of the medicinal plants are only blended. This is because this method is easiest to do compared to direct processing, because both ways must pass several stages in processing. Medicinal plants whose processing is only boiled are Africa, pegagan,

starfruit, meniran, srikaya, ciplukan, bay, pandan, tapak dara, avocado, turmeric, papaya, lemon, kersen, siantan, aloe vera, boroco. Medicinal plants processed by blending are mengkudu and cucumber. Boiling is conducted so that substances nutritious in the plant dissolve into the water solution. Water used in boiling water is water that is colorless, odorless, tasteless, and clear [20], [21]. The results of research showed that there is no difference in the processing and use of medicinal plants although the respondents come from different tribes. This is because the respondents from Javanese, Pak-Pak Dairi and Acehnese have lived for years in the area of Rundeng whose inhabitants came from Pak-Pak Boang tribe.

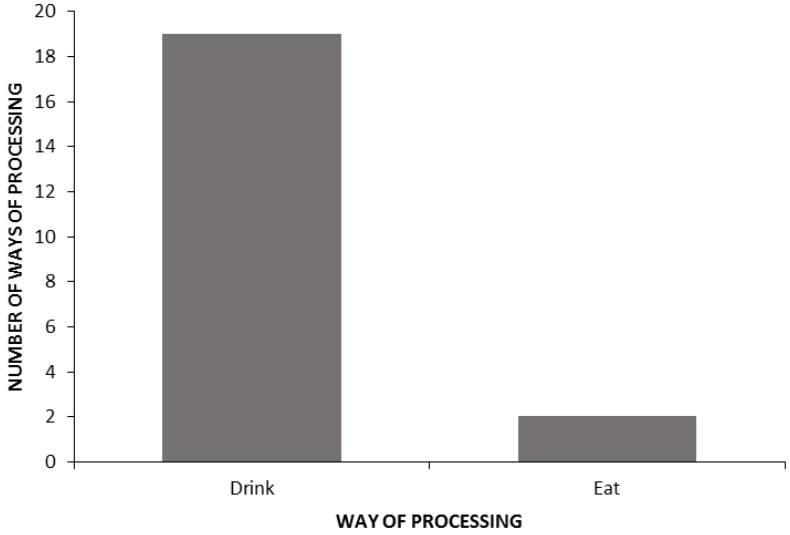

Figure 3. The Way to Process Medicinal Plants for Healing Hypertension in Rundeng Subulussalam.

The Way to Use Medicinal Plants to Cure Hypertension Disease in Sub District Rundeng of Subulussalam City

The way to consume plants as a remedy for healing hypertension is by drinking and eating. The way to consume medicinal plants to cure hypertensive diseases is shown in Figure 4 below.

The Figure 4 shows that several ways of consuming medicinal plants in the Sub District Rundeng of Subulussalam city for healing hypertensive disease from 21 types of plants are 21 by drinking and 2 types of

plants by eaten. Medicinal plants that are drunk are mengkudu, cucumber, africa, pegagan, starfruit, meniran, soursop, ciplukan, bay leaves, pandan, tapak dara, avocado, turmeric, papaya, lemon, siantan, aloe vera, and boroco. Medicinal plants that are consumed by eaten directly are sweet starfruit and cucumber.

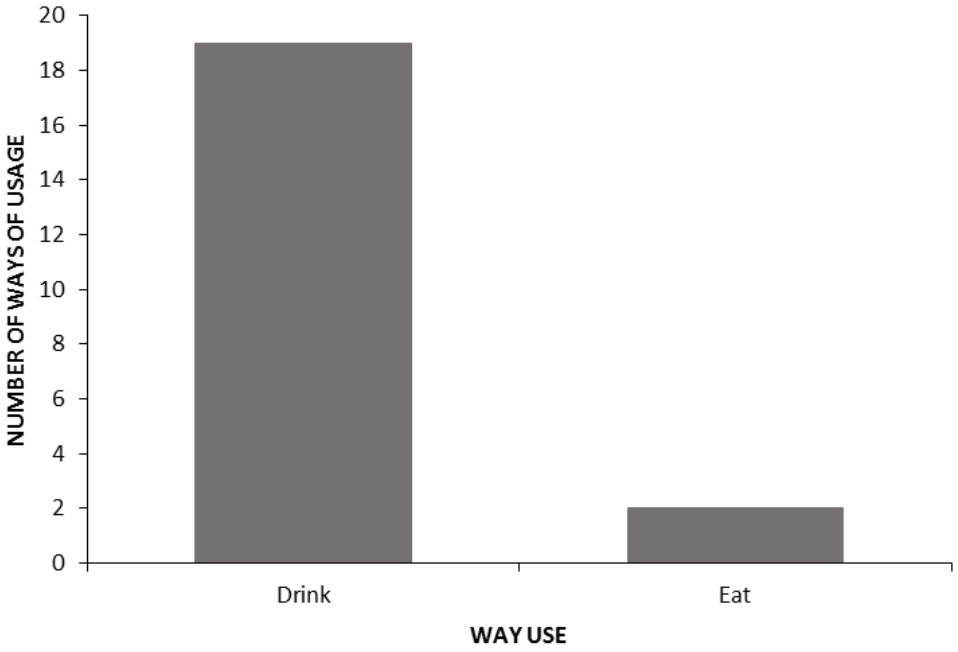

Figure 4. The Way to Consume Medicinal Plants to Cure Hypertension Disease in Sub District Rundeng of Subulussalam City.

CONCLUSIONS

Based on the result of the research, it can be concluded that there are 22 types of medicinal plants consisting of 21 genus for healing hypertension diseases used by the people in Sub District Rundeng of Subulussalam City. Parts of plants used for healing hypertension is roots, stems, leaves, fruits, rhizomes, or all parts of plants. Plants are treated for healing hypertension by boiling, blended and pounded. Plants are consumed for the treatment of hypertension by drinking and eating directly.

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