

Medicinal Plants Used by Traditional Healers for the Treatment of Various Diseases in Ondae Sub-ethnic of Poso District in Indonesia

Nuning Rahmawati^{1*}, Yuli Widiyastuti¹, Rahman Purwanto², Siti Sri Lestari³, Ikhsan Hi. Amir Sene⁴, Yulianti Bakari⁵

¹Medicinal Plant and Traditional Medicine Research and Development Center, Central Java, Indonesia

²Madani Junior High School, Palu, Central Sulawesi, Indonesia

³Graduate students of Biology Faculty, Gadjah Mada University, Yogyakarta, Indonesia

⁴PKMK FKKMK, Gadjah Mada University, Yogyakarta, Indonesia

⁵Biology Faculty, Tadulako University, Palu, Central Sulawesi, Indonesia

*Corresponding author. E-mail: nunrahmawati@gmail.com

ABSTRACT

Exploration and inventory of medicinal plants and their use in the community based on local wisdom need to be conducted. This ethno-pharmacological study was undertaken to documenting the medicinal plants and herbal formula utilized by traditional healers in prevention as well as treatment of various diseases in Ondae sub-ethnic of Central Sulawesi of Indonesia. The research was conducted in five selected villages located in Poso District of Central Sulawesi. Traditional healers were selected using purposive sampling based on many inclusion criteria. Data collection was done by direct interviews with traditional healers using a structured questionnaire, observation, and medicinal plants specimen collection. Totally, there are 66 medicinal plant species distributed among 34 plants family used by traditional healers in Onda'e sub-ethnic whereas Euphorbiaceae is the most widespread family used. As of 146 herbal formula are determined among 5 selected traditional healers to prevent and cure ailments. Leaf (34.6%) is recognized as the most common plant part used followed by herbaceous plant parts (21.5%), while flower (0.6%) is the least plant parts utilized in Ondae sub-ethnic. A tumor (cancer) and child healthcare are the most general disease handled by traditional healers in Onda'e sub-ethnic. Traditional knowledge of medicinal plants utilization both for preventing and healing diseases still exist in fifth selected villages among Onda'e sub-ethnic of Central Sulawesi especially by traditional healers. Good documentation on the database is expected to be one of the ways to prevent the loss of this local knowledge. Recommendation: Further investigation of laboratory experimental research needs to be conducted to provide scientific data on the safety and efficacy of medicinal plants utilized by traditional healers.

Keywords: *Ondae sub-ethnic, ethno-pharmacological, local knowledge*

1. INTRODUCTION

From a total of 40,000 species of medicinal plants in the world, it is known that as many as 30,000 species grow and are in the territory of Indonesia, but only around 7,500 plant species have been identified for their efficacy and pharmacological activities and only 1,200 species of medicinal plants have been utilized as raw material for manufacturing herbal medicine (1).

Information regarding the use of medicinal plants for traditional medicine is known and recognized by most of the world's population. Indigenous traditional knowledge is generally obtained from previous generations (1) and has largely remained

undocumented. Cultural modernization has the potential to be one of the causes of the loss of traditional local knowledge that is owned by traditional communities in Indonesia (2).

Ondae is a sub-ethnic of Pamona ethnic group of Poso district located in Central Sulawesi Province. In Central Sulawesi, generally the people of an ethnic group are called as "To", and also for Ondae where the Ondae ethnic community is called To Ondae. The name began with "To" meaning "people of" usually followed by the name of the origin village or some geographic marker (3). With the geographical position of Central Sulawesi which is in the "heart" of Wallacea and identified as one of the centers of biodiversity in the world, this

region is a unique region rich in endemic flora and fauna, one of which is medicinal plants (4).

Ethno-botany and ethno-pharmacological research data related to medicinal plants and their use in Central Sulawesi are readily available (2, 5, 6, 7, 8, 9, 10) but those that specifically identify medicinal plant utilization in the Ondae sub-ethnic are not yet available. Therefore, exploration and inventory of medicinal plants and their use in the community especially in Ondae sub-ethnic based on local wisdom need to be conducted. This ethno-pharmacological study was undertaken to documenting the medicinal plant and herbal formula utilized by traditional healers in prevention as well as treatment of various diseases in Ondae sub-ethnic of Central Sulawesi of Indonesia.

2. METHOD

This research was carrying out in Ondae sub-ethnic, East Pamona sub-District of Poso Regency of Central Sulawesi Province, Indonesia during May 2017. Based on the latitude and longitude, Poso Regency is located at 1° 06'44" 892"-2° 12' 53,172" SL and 120° 05' 96"-120° 52'4,8" EL with an area of 7112, 25 km or about 11.5% of Central Sulawesi Province wide (11).



Figure 1. Map of Poso Regency, Central Sulawesi Province, Indonesia where Ondae sub-ethnic of East Pamona sub-District located

Data collecting was carrying out by interview, observation and medicinal plants sample identification and collection. The interview was conducted using a systematic structured questionnaire to selected traditional health practitioners who met the specified inclusion criteria. This is intended to obtain demographic data of healers, explore information on the ailments overcoming, medicinal plants used, the

vernacular name, plant part used, herbal composition, dosage form and the way of preparation.

The traditional healer selection based on purposive sampling method. Information related to the existence of traditional healers was obtained from tribe leaders, religious leaders, communities and community leaders in Ondae sub-ethnic. From the results of coordination with them, it was known that there are as many as seven traditional healers who have knowledge and treatment skills using medicinal plants in the Ondae sub-ethnic, after a further confirmation it was discovered only five traditional healers met the specified inclusion criteria. The specified inclusions criteria including traditional healer who was the native ethnic or enculturated, had both knowledge and expertise on utilizing medicinal plants for healing diseases, the most well-known healers, had the highest number of patients and recognized by the communities.

Data analysis of the relative importance of each plant species was reported as the use value (UV) and it was calculated using the following formula (1):

$$UV = \sum U/n \quad (1)$$

Where UV is the use value of a species, U is the number of use reports cited by each informant for a given plant species and n is the total number of informants interviewed for a given plant. The UV is helpful in determining the plants with the most frequently indicated in an ailment treatment. UV will be higher for the species with more cited indication reports and become lower for species with less use reports.

3. RESULTS AND DISCUSSION

The survey revealed all selected traditional healers came from rural areas in East Pamona sub-district of Poso District, Central Sulawesi Province. The traditional healer characteristics included gender, age, level of education and patient number per month were completely shown in table 1.

Table 1. Characteristic of selected traditional healers as informants

Characteristic	Informants				
	I	II	III	IV	V
Gender	Male	Female	Female	Female	Female
Age (years old)	84	48	60	47	43
Education	Elementary school	Elementary school	Junior high school	Junior high school	Elementary school
Hometown	Taripa village	Didiri village	Poleganyara village	Kelei village	Matialemba village
Patient number per month	28	8	25	24	3

The ailments treated, herbs formula and composition, medicinal plant used, medicinal plant sources, vernacular name, plants growth form, plant parts used, preparation and the route of administration data collected among selected traditional healers, identified botanically scientific name and plant have been summarized in Table 2. It was noted that in most cases, traditional healers in Ondae sub-ethnic tend to prepare their herbal formula in single compound rather than in combining formula. Herbs formula prepared

from more than one plant (mixtures) made up 23.02% while those from single plants made up 76.98%.

Table 2. Medicinal plants used by traditional healers in Ondae sub-ethnic

Family	Vernacular name	Scientific name	Use value	Growth form	Part used	Ailments treated
<i>Acantaceae</i>	Pica Beling	<i>Strobilanthes crispa</i>	0.2	Shrub	Herbaceous part	Kidney disease
	Sive	<i>Graptophyllum pictum</i> (L.) Griff	0.6	Herb	Leaf	Kidney disease, Appendicitis, cyst
	Kince Mbeling	<i>Strobilanthes crispa</i>	0.2	Shrub	Leaf	Kidney disease
<i>Anacardiaceae</i>	Taripa	<i>Mangifera indica</i> L.	0.2	Tree	Leaf	Hypertension
<i>Annonaceae</i>	Sirikaya	<i>Annona muricata</i> L.	0.6	Tree	Leaf	Tumor/cancer, magical and spiritual healing, hypercholesterolemia
<i>Apiaceae</i>	Soderei	<i>Apium graveolens</i> L.	0.2	Herb	Leaf	Hypertension
<i>Arecaceae</i>	Enau	<i>Arenga pinnata</i>	0.2	Tree	Root	Diabetes
	Mamongo	<i>Areca catechu</i> L.	0.6	Tree	Root, pulp	Diabetes, fever, kidney disease
<i>Asteraceae</i>	Mbula-mbila	<i>Ageratum conyzoides</i> L.	0.6	Herb	Root, herbaceous part	Stomachache, cough
	Sambung nyawa	<i>Ginura procumbens</i> (Blume.) Miq.	0.2		Leaf	Wound healing
	Ewomawao	<i>Ageratum conyzoides</i> L.	0.4	Herb	Herbaceous part, Other parts	Fever, pre post-partum treatment
<i>Clusiaceae</i>	Manggis	<i>Garsinia mangostana</i> L.	0.2	Tree	Rind	Hypercholesterolemia
<i>Convolvulaceae</i>	Spesies A	<i>Ipomea</i> sp.	0.2	Liana	Leaf	Appendicitis
<i>Costaceae</i>	Tawoo'	<i>Costus spiralis</i>	0.6	Herb	Stem bark, stem	Sore throat, Fever
<i>Crassulaseae</i>	Pakumba	<i>Bryophyllum pinnatum</i>	0.2	Herb	Leaf	Kidney disease
<i>Cucurbitaceae</i>	Paria	<i>Momordica charantia</i> L.	0.2	Herb	Leaf	Cough
<i>Cyperarceae</i>	Tetari	<i>Cyperus rotundus</i> L.	0.2	Herb	Other parts	Urolithiasis
<i>Euphorbiaceae</i>	Tai Kando	<i>Euphorbia hirta</i>	0.4	Herb	Other parts	Appendicitis
	Lepati	<i>Aleurites moluccanus</i> (L.) Wild	0.4	Tree	Seed	Cosmetic, diarrhea

	Gedi	<i>Abelmoschus manihot</i>	0.2	Tree	Herbaceous part	Kidney disease
	Balacae	<i>Jatropha curcas</i> L.	0.2	Tree	Leaf	Bone fracture
	Tomene	<i>Jatropha curcas</i> L.	0.2	Tree	Leaf	Tumor/cancer
	Kasubi	<i>Manihot esculenta</i>	0.2	Tree	Leaf	gastritis
<i>Fabaceae</i>	Tambaole	<i>Cassia alata</i> L.	0.6	Tree	Leaf	Gastritis, skin disease, dyspepsia
<i>Iridaceae</i>	Pia manu	<i>Eleutherine bulbosa</i> (Mill.) Urb	0.2	Herb	Bulb	Tumor/cancer
<i>Lamiaceae</i>	Ta'inyara	<i>Hyptis capitata</i> Jacq.	1.0	Herb	leaf, herbaceous part	Stomachache, tumor/cancer, cyst
	Jumbi Nggaru', kumis kucing	<i>Orthosiphon aristatus</i> (Blume) Miq.	1.4	Herb	Herbaceous part, Other parts	Urolithiasis, Appendicitis, kidney disease, liver disease
	Mayana	<i>Coleus hybridus</i>	0.2	Herb	Herbaceous part	Tumor/cancer
	Ta'inyara Kodi	<i>Hyptis capitata</i> Jacq.	0.2	Herb	Root	Stomachache
	Ta'inyara Bose	<i>Hyptis rhomboidea</i> Jacq.	0.2	Herb	Root	Stomachache
<i>Lauraceae</i>	Pakanangi	<i>Cinnamomum verum</i>	0.2	Tree	Stem bark	Bone fracture
<i>Liliaceae</i>	Bawang Merah	<i>Allium ascalonicum</i> L.	0.4	Herb	Bulb	Bone fracture, anthelmintiasis
<i>Loranthaceae</i>	Pomuyan Entonci	<i>Macrosolen cochinchinensis</i> L.	0.4	Plant parasites	Leaf, herbaceous part	Liver disease, tumor/cancer
	Pomuya Tonci	<i>Loranthus</i> sp.	0.2	Plant parasites	Herbaceous part	Tumor/cancer, liver disease
<i>Mackinlayaceae</i>	Tele-tele	<i>Centella asiatica</i> L.	0.6	Herb	Other parts	Appendicitis, cyst,
<i>Malvaceae</i>	Rabuate	<i>Sida rhombifolia</i>	0.2	Herb	Pulp	Pre-post-partum treatment
	Rosela	<i>Hibiscus sabdariffa</i> L.	0.2	Herb	Leaf	Hyperuricemia
	Coklat	<i>Theobroma cacao</i> L.	0.4	Tree	Fruit, leaf	Boils, anti-inflammation
	Kapas	<i>Gossypium hirsutum</i> L.	0.4	Tree	Leaf	Heart disease, tumor/cancer
	Soklat	<i>Theobroma cacao</i>	0.2	Tree	Fruit	Boils
<i>Muntingiaceae</i>	Gersen	<i>Muntingia calabura</i> L.	0.4	Tree	leaf, herbaceous part	Hypercholesterolemia, diabetes
<i>Musaceae</i>	Loka	<i>Musa paradisiaca</i> L.	0.4	Tree	Leaf	Diabetes, wound healing

	Loka Tunu	<i>Musa x paradisiaca</i> L.	0.4	Tree	Other parts	Bone fracture, liver disease
<i>Myrtaceae</i>	Cingke	<i>Syzygium aromaticum</i> (L.) Merr. & Perry	0.2	Tree	Seed	Other diseases
	Jambu	<i>Psidium guajava</i> L.	0.4	Tree	Leaf	Stomachache
<i>Phyllanthaceae</i>	Simpojuyu	<i>Phyllanthus ninuri</i> L.	0.2	Herb	Herbaceous part	Cough
	Dukun Anak	<i>Phyllanthus ninuri</i> L.	0.6	Herb	Other parts	Appendicitis, kidney disease, cyst
<i>Piperaceae</i>	Nepo	<i>Piper umbellatum</i> L.	0.4	Perdu	Leaf, root	Tumor/cancer
	Bou-Bou	<i>Peperomia pellucida</i> L. Kunth	0.4	Herb	Other parts	Hypercholesterolemia, hyperuricemia
<i>Poaceae</i>	Timbowane	<i>Cymbopogon citratus</i> (DC.)	0.2	Herb	Stem	Bone fracture
	Bulu Batu	<i>Bambusa</i> spp.	0.2	Tree	leaf	Cold
	Lee	<i>Imperata cylindrica</i> L. Raeush	0.6	Herb	Root, herbaceous part	Liver disease, tumor/cancer, Appendicitis
<i>Portulacaceae</i>	Luangkando	<i>Portulaca tuberosa</i>	0.2	Herb	Other parts	Appendicitis
<i>Rosaceaea</i>	Lokaya mbeyo	<i>Rubus idaeus</i> L.	0.4	Shrub	Leaf, root	Tumor/cancer, cyst
	Lokaya Baula	<i>Rubus idaeus</i> L.	0.2	Shrub	Root	Tumor/cancer
<i>Rutaceae</i>	Lemo Polea	<i>Cytrus hystrix</i>	0.2	Tree	Herbaceous part	Tumor/cancer
<i>Solanaceae</i>	Tomate	<i>Solanum lycopersicum</i>	0.6	Herb	Herbaceous part	Pre post-partum treatment, Fever
	Palola Yopo	<i>Solanum torvum</i>	0.2	Perdu	Root	Diabetes
	Lada	<i>Capsicum annuum</i> L.	0.4	Herb	Stem	Fever, asthma
<i>Verbenaceae</i>	Kajungkuluri	<i>Lantana camara</i>	0.2	Shrub	Herbaceous part	gastritis
	Iku Valesu	<i>Stachytarpheta jamaicensis</i> (L) Vhal	0.6	Herb	Other parts	Appendicitis, kidney disease, cyst
<i>Zingiberaceae</i>	Temulawak	<i>Curcuma zanthorrhiza</i> Roxb	0.2	Herb	Rhizome	Liver disease
	Kuni	<i>Curcuma mangga</i> L.	0.2	Herb	Rhizome	Wound healing
	Kuni	<i>Curcuma longa</i> L.	0.8	Herb	Rhizome	Child health care, hemorrhoid, wound healing, cough, gastritis

In this study, as of 66 plant species were documented from selected traditional healers in Ondae sub-ethnic of Poso Regency which distributed within 34 families whereas Euphorbiaceae and Lamiaceae had the highest number of

species. Those top ten most widely spread family (as shown in Figure 1) used were Euphorbiaceae (9.09%), Lamiaceae (9.09%), Malvaceae (7.58%), Acanthaceae (4.55%), Asteraceae (4.55%), Poaceae (4.55%), Solanaceae (4.55%), Zingiberaceae (4.55%) and Arecaceae (3.03%) as well. While Rutaceae, Annonaceae, Rutaceae and another fifteen families (Anacardiaceae, Apiaceae, Clusiaceae, Convolvulaceae, Costaceae, Craasulaceae, Cucurbitaceae, Cyperaceae, Fabaceae, Iridaceae, Iauraceae, Liliaceae, Loranthaceae, Mackinlayaceae, Muntingiaceae, Portulacaceae) were recognized as the least families utilized by traditional healers to overcome the ailments. Those the least families contributed one species on each.

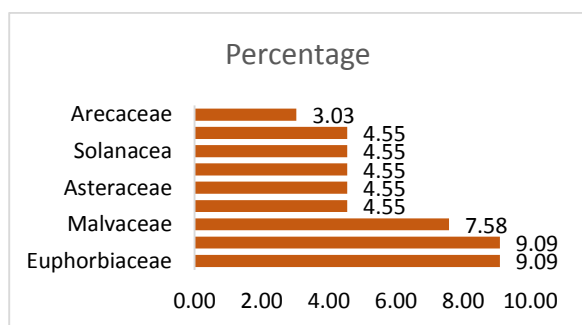


Figure 2. The top ten most widely spread family of medicinal plants

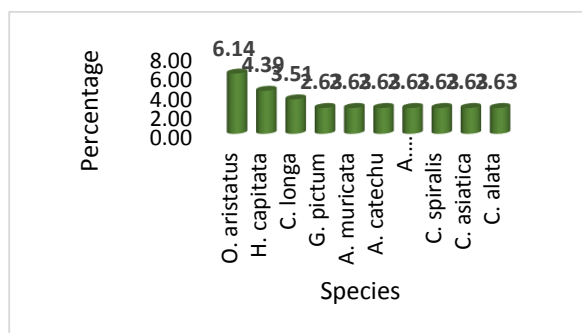


Figure 3. The top ten most frequently used medicinal plants used by informants

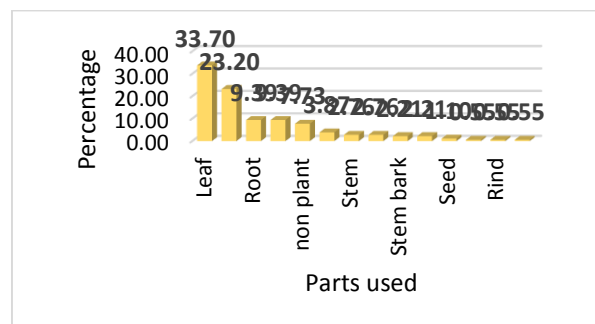


Figure 4. Plant parts used by informants

From this present study, *Orthosiphon aristatus* L was determined as the leading species utilized by traditional healers. Most medicinal plant species were harvested for their leaves (33.70%) followed by herbaceous part (23.20%) and root (9.39%) to prepare remedies (Figure 3). Flower, rind and pulp were the least common plant part used.

Table 3. Number of formula used by informants for each ailments

Ailments	Number of formula used by Informants					Total formula
	I	II	III	IV	V	
Child health treatment	3	9	4	-	3	19
Undefined diseases	3	3	3	6	-	15
Tumor/cancer	6	4	-	-	2	12
Kidney disorders	1	5	1	2	1	10
Cough	-	2	1	2	2	7
Hypercholesterolemia	2	4	1	-	-	7
Pre and postpartum treatment	1	2	1	1	2	7
Gastritis	-	4	-	-	1	5
Hypertension	-	2	1	-	1	4
Diabetes	1	3	-	-	-	4
Wound healing	2	1	-	-	1	4
Diarrhea	1	1	1	1	-	4
Stomachache	1	1	1	-	1	4
Fever	-	3	-	-	-	3
Venereal treatment	1	-	1	-	1	3
Rheumatics	1	1	-	-	1	3
Dental care	-	1	-	-	2	3
Liver disease	1	1	1	-	-	3
Appendicitis	-	1	1	1	-	3
Bone fracture	-	1	-	-	1	2
Flu	-	2	-	-	-	2
Helminthiasis	1	1	-	-	-	2
Asthma	-	2	-	-	-	2
Hemorrhoids	-	2	-	-	-	2
Boils	1	1	-	-	-	2
Antiinflammation	-	-	-	-	1	1
Diuretics	-	1	-	-	-	1
Hernia	-	-	1	-	-	1
Anemia	-	1	-	-	-	1
Magical spiritual healing	1	-	-	-	-	1
Malaria	-	1	-	-	-	1
Nose bleeding	-	1	-	-	-	1
Neonatal treatment	-	1	-	-	-	1
Cosmetics	-	1	-	-	-	1
Skin disease	-	1	-	-	-	1
Ear disease	-	-	1	-	-	1
Constipation	-	1	-	-	-	1
Tuberculosis	-	-	-	1	-	1
Thypus	-	-	-	-	1	1
Formula per informants	27	65	19	14	21	146

Of 146 herbs formula documented from five selected traditional healers in Ondae sub-ethnic of Poso District, it revealed whether 2nd informant had the most herbs formula followed by 1st informant as shown in Table 3. Otherwise, the 1st informant reported to have more patient than patient number of 2nd informant monthly. The administration route of herbs formula consisted of three category, they are internal, external and combination. The most common route of provision was internal (69%) followed by external (28%) and combination route (3%). From this current ethno-pharmacological study, child health treatment was known as the most frequent ailment handled by traditional healers followed by tumor/cancer and kidney disorders as shown in Figure 5.

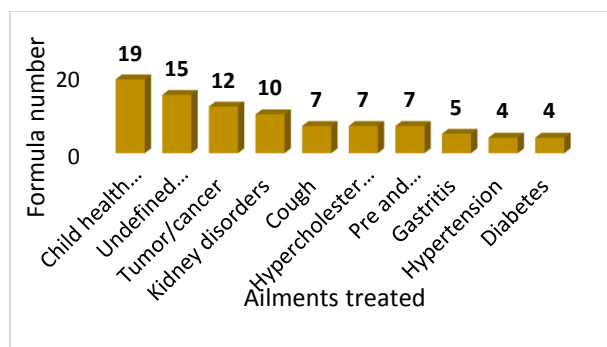


Figure 5. The ten leading ailments treated by informants

Discussion

This ethno-pharmacological study was undertaken to documenting the medicinal plants and herbal formula utilized by traditional healers in prevention as well as treatment of various diseases in Ondae sub-ethnic of Central Sulawesi. Plants are very pivotal resources in both healthcare and pharmaceutical drugs production (13). All informants age in Ondae sub-ethnic were more than 40 years old and had low level of formal education. This is in line with result stated by Xavier et al. (2014) (14) whether most of informant in Kani tribes of South India did not have formal education and most of them lives in the region. Most of older generation with low formal education tend to have more knowledge within medicinal plants usage (15). Research conducted by Nyundu and Naido (16) shows that South African youth do not place traditional medicine as a very important part of their lives, they will choose traditional medicine when they do not get satisfaction with conventional treatment. Several factors affect their knowledge and attitudes towards traditional medicine including age, education level and the surrounding environment (17). The other factors on utilizing traditional medicine are the belief of the effectiveness of traditional medicine as an inheritance, saves time and money and is easier to obtain (6) also incomparable advantages, such as abundant clinical experiences, and their unique diversity of chemical structures and biological activities (18). Nevertheless, accessibility, low cost, effectiveness and belief in safeness and tradition influence the use of the medicine (19). Good documentation is needed to maintain historical records knowledge on medicinal plants before they are extinct forever (20). This study revealed the presence and the utilization of 66 species distributing in 34 families and 146 herbal formula in Ondae sub-ethnic.

From this study, Euphorbiaceae represents the highest number of species utilized by traditional healers in Ondae sub-ethnic for therapeutic goals. This is in line with previously studies reported the usage of medicinal plants from the family Euphorbiaceae by the Pekurehua tribe in Wuasa and Kaduwa Village, Central Sulawesi to overcoming fever, mouth sores, wounds and back pain, they are *Euphorbia hirta* L, *Acalypha indica* L and *Jatropha curcas* L (7). Likewise, research conducted in the Kaili Ija ethnic group in Bora village, Sigi Biromaru sub-district,

Sigi Regency, Central Sulawesi reported that five species of the Euphorbiaceae family plant were used as traditional medicine, namely *Jatropha curcas* L, *Acalypha indica* L, *Euphorbia hirta* L, *Manihot utilisissima* Pohl and *Phyllanthus niruri* L (6). Nevertheless, these are contrary to the research results submitted by Kadir et al. (15), Odhiambo et al. (21) and Gairola et al. (22) whereas Asteraceae is recognized as the most utilized family. The high utilization rate of the Euphorbiaceae family is related to the number of species from that family which reaches 7500 species distributed in 300 genera where each species has a diverse range of pharmacological activities (23).

O. aristatus from Lamiaceae family showed the highest percentage (6.14%) as well as highest use value (UV=1.4) of species exerted by informants of Ondae sub-ethnic. Most of traditional healers applied herbaceous part of this plant for healing such ailments like kidney disease, urolithiasis, appendicitis and liver disease. This is in accordance with Silalahi (2019) in which *O. aristatus* from genera *Orthosiphon* was used in traditional medicine to prevent many disease such as diabetes mellitus, kidney stones, edema, rheumatism, hepatitis, hypertension and jaundice. It has been reported whether some of secondary metabolites in the *O. stamineus* which contributing in therapeutic effect are terpenoids, phenols, ispenimoids, flavonoids, benzochromes and organic acid derivatives (24).

Leaves were the most preferred plant part used in the study area with a percentage as of 33.70%, followed by herbaceous parts, root and other parts. Higher preference of leaves utilized could be due to its higher availability in the area as well as its established pharmaceutical potency. Leaves were the most widely used part of the plant for treatment by the Kaili ethnic community of Central Sulawesi (6). Many studies have been conducted in various regions also showed the dominance of leaf organs in the use of traditional medicine (7,20). This is quietly different with study conducted by Shrestha et al. (2016) (12) in Nepal, whereas root was the most utilized parts followed by leaves and other plant parts. According to traditional health practitioner, leaves have a high level of effectiveness as drugs (5). Traditional healers in Ondae sub-ethnic obtained and collected plant materials mainly from the house yard (76.8%) and the surrounding forest (12.15%). Forest was recognized as the center of healing illnesses of indigenous people of Tau Taa Vana in Tojo Una-Una Central Sulawesi (8). Communities surrounding forest areas uses the existing medicinal plants for healing purposes based on knowledge passed down from generations (9). Topography, climate, culture and ethnic are some factor affecting diversity of plant species in the home garden. It was also stated whether plants had more diversity during dry season than rainy season in the home garden (25).

Child health diseases were the most frequent ailments healed by traditional healers in Ondae sub-ethnic of Poso District of Central Sulawesi Province followed by other disease, tumor/cancer and kidney disease. This is in accordance with many previous researches reported. Study of 400 children with the age of 12 to 59 months conducted in Jamnagar District, India exhibited acute respiratory infection and diarrhea as two leading disease in child with

prevalence as of 17.25 and 2.5% respectively (26). Pneumonia, diarrhea, measles, tetanus and polio were categorized as five child killer diseases in Nigeria and the analysis exhibited the close connection between under-five child mortality rate with incidence of pneumonia and diarrhea (27). Meanwhile, data on ten diseases with the highest number of cases in Poso district in 2017 included upper respiratory infections, gastritis, arthritis, hypertension, malaria, diarrhea, hypotension, tonsillitis, skin diseases and accidents (11). Report of public health service of Singgani, Palu City in 2016 showed an increase of acute respiratory infections as of 3,270 cases on children at mine area. The number of Central Sulawesi people with acute respiratory infection (ARI) was increased significantly (46.1%) during 2012 to 2016 (28). Prevalence of ARI was significantly less in exclusively breastfed children compared to not exclusively breastfed children ($p=0.002$) (29). Children are generally more susceptible to diseases.

4. CONCLUSION

In conclusion, the study clearly demonstrated that traditional healers in Ondae sub-ethnic plays important role on treating many ailments utilizing medicinal plants with the total number of 66 species classified into 34 families, distributing within 146 herbal formula. The species with the highest use value was *Orthosiphon aristatus* and plant family contributed the most species number was Euphorbiaceae. The efficacy and safety of all reported medicinal plants needs to be further evaluated for phytochemical and pharmacological studies to provide scientific database as an alternative on drugs development.

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