Ethnopharmacological Study of Medicinal Plants in the Rawamerta Region Karawang, West Java, Indonesia

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Abstract

BACKGROUND: Traditional medicinal plants’ application has significant advantages for cultural development, acceptability, and economic affordability. Furthermore, they are claimed to cure several types of diseases compared to modern medicines.

AIM: This study aims to document and preserve the use of ethnomedicinal plants to treat various diseases by the community in the Rawamerta Region, Karawang, West Java, Indonesia.

METHODS: Fieldwork was carried out from January to August 2022 through face-to-face interviews, questionnaires, and discussions. Plant species were identified based on standard taxonomic methods, floral morphological characteristics, and possibly, by using samples for comparison, as well as expert consultation and literature. They were then grouped into families according to the Cronquist classification system. Furthermore, their names were checked on the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org).

RESULTS: It was discovered that 50 plant species belonging to 31 families spread across 46 genera are employed for the treatment of various diseases in Rawamerta, such as diabetes, inflammation, hypertension, fever, dyslipidemia, antiseptic, gastric disorders, anticancer, cough, gout, etc. Based on the results, Acanthaceae, Fabaceae, Zingiberaceae, and Myrtaceae are the most dominant families applied for the treatment purpose. Meanwhile, the most frequently used genera are Syzygium, Piper, Curcuma, and Annona. The plant part majorly used in medicine preparation is the leaf (64%), followed by fruit (14%), rhizome (10%), and stem (6%), as well as flower, peel, and stem and leaf (2%, respectively). The most commonly applied preparation method is an infusion (48%), followed by decoction (44%), juice (4%), as well as paste and drops (2%, respectively). This study also showed more than one plant species is used for treating the same disease.

CONCLUSION: The results confirm that the Sundanese people in Rawamerta still rely heavily on medicinal plants for their health-care system. However, efforts to preserve medicinal plants and local wisdom in the region have not been significant. Therefore, the indigenes and the government are advised to carry out in situ and ex situ conservation strategies to maintain the availability of medicinal plants in the region.
Materials and Methods

Study area

Rawamerta is situated in Karawang Regency, West Java, Indonesia, with an area of 49,113 km². This region has an altitude of 12 m above sea level with a maximum average air temperature of 30°C and a minimum of 27°C. Moreover, the location is between 06°14′283″ South Latitude and 107°19′599″ East Longitude. The region is a humid tropical climate area that is mostly inhabited by the Sundanese (98%) and other tribes (2%). The vegetation in the study area is under moist and dry deciduous forest type as presented in Figure 1.

Data collection

A study in the context of interviewing was performed to investigate the traditional application of plants and to identify the parts of plants used by local people. To document the available information about medicinal plants from tribal practitioners, several field visits were carried out from January to August 2022 in the Rawamerta Region, Karawang, West Java, Indonesia. Participants of the study composed of 65 locals well-known people of both genders with an average age of 50 years from the study area. Local people were asked to collect the name of the plants, to indicate against which illnesses the plants were used and to determine the methods of plant applications. Furthermore, only those species that could be directly indicated and collected by the local persons were studied. The vernacular names were collected with the cooperation of local people. For each species, the following information was collected: botanical taxon, family name, part used, and administration methods (such as paste, powder, juice, and decoction).

Botanical identification

Plant species were identified based on standard taxonomic methods, floral morphological characteristics, and possibly, using samples for comparison, as well as expert consultation and literature [6]. They were then grouped into families according to the Cronquist classification system [7], except for Pteridophyta and Gymnosperms. Furthermore, their names were checked on the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org).

Ethics statement

All participants provided oral prior informed consent before the interviews, and the participants shown in figures in the paper gave consent to have their images published.

Results and Discussion

A total of 50 plant species belonging to 31 families spread across 46 genera were discovered to be commonly employed by the local Sundanese for the treatment of various diseases, indicating that...
the study site is affordable in biodiversity. The results also showed that the most widely used plant family is Acanthaceae (five species), followed by Fabaceae and Zingiberaceae (four species, respectively), and Myrtaceae (three species), while the remaining 31 families are represented by <3 species. Based on Table 1, the most frequently used genera are Syzygium, Piper, Curcuma, and Annona (two genera, respectively).

Among various parts of the plant, the leaf (64%) is majorly used in medicine, followed by fruit (14%), rhizome (10%), and stem (6%), as well as flower and peel (2%, respectively) as demonstrated in Figure 2. It is easier to prepare and extract the leaf’s active substance for treatment. At the same time, leaves create less effect on the mother plant [8].

According to Figure 3, the most commonly applied preparation method is an infusion (48%), followed by decoction (44%) and juice (4%), as well as paste and drops (2%, respectively). These results are in line with a previous study that the most widely used forms of traditional medicine by the community are infusion and decoction [6]. This present study also showed more than one plant species is employed for treating the same disease. For example, Allium sativum, Andrographis paniculata, Anredera cordifolia, Carica papaya, Clinacanthus nutans, Citoria tematae, Curcuma zanthorrhiza, Garcinia mangostana, Mesona palustris, Mimoso pudica, Momordica charantia, Morinda citrifolia, Pandanus amaryllifolius, Persea americana, Phaleria macrocarpa, Phyllanthus niruri, Piper betle, Pluchea

![Table 1: Ethnomedicinal plants, local name, mode of administration and uses in Rawamerta, Karawang, Indonesia](https://oamjms.eu/index.php/mjms/index)
indica, Ruellia tuberosa, Smallanthus sonchifolius, Solanum torvum, S. strobilanthis crispa (Diabetes), A. sativum, A. paniculata, A. cordifolia, Artocarpus altillis, Averrhoa carambola, C. papaya, Cassia siamea, Centella asiatica, G. mangostana, Manihot utilissima, M. charantia, M. citrifolia, P. amaryllifolius, P. americana, Ruellia tuberosa, Syzygium polyanthum (Hypertension), A. sativum, A. cordifolia, Artocarpus altillis, Cassia siamea, P. macrocarpa, Zingiber officinale (Dyslipidemia), A. sativum, A. paniculata, C. papaya, Centella asiatica, C. nutans, Curcuma longa, C. zanthorrhiza, Cymbopogon citratus, G. mangostana, Ipomoea staphylina, Mangifera foetida, M. pudica, Moringa oleifera, P. macrocarpa, Physalis angulata, P. betle, Piper sarmentosum, Ruellia tuberosa, Solanum torvum, Syzygium aromaticum, Syzygium polyanthum, Zingiber officinale (Inflammation), A. paniculata, Annona squamosa, C. papaya, C. nutans, Moringa oleifera, Ocimum sanctum, Piper betle, Piper sarmentosum (Fever), A. sativum, Annona squamosa, Apium graveolens, Artocarpus altillis, Cassia siamea, Centella asiatica, C. nutans, Curcuma longa, C. zanthorrhiza, Cymbopogon citratus, Ipomoea staphylina, Mangifera foetida, M. pudica, Moringa oleifera, Orthosiphon aristatus, P. macrocarpa, Physalis angulata, Piper betle, Ruellia tuberosa, Solanum torvum, Syzygium aromaticum, Syzygium polyanthum, Zingiber officinale (Pain), Curcuma longa, Ipomoea staphylina, Ocimum sanctum, Zingiber officinale (Stomach disorders), Abrus precatorius, Annona muricata, C. zanthorrhiza, G. mangostana (Anticancer), Mangifera foetida, Syzygium aromaticum, Syzygium polyanthum (Gout), Abrus precatorius, Citrus aurantiifolia, Piper sarmentosum, Zingiber officinale (Cough), Abrus precatorius, Curcuma longa, Cymbopogon citratus, Piper betle, Piper sarmentosum (Antiseptic). In Indonesia, rural communities have developed knowledge about the medicinal and therapeutic properties of natural resources, as well as contributed to the maintenance and transmission of ethnomedicinal knowledge in society [9], [10]. In this study, almost all respondents (99%) claimed to know and use medicinal plants. The high percentage of community knowledge about medicinal plants identified in Rawamerta may be due to some factors, such as the lower influence of contemporary urban lifestyles and the strength of cultural traditions in rural communities [11], [12]. This shows that medicinal plants still play an important role in primary health services in the region (Figure 4).

Figure 4: Field survey and interviews with the people of the Rawamerta Region (Photo by Eni Nuraeni in July 2022)

One of the most important aspects of this study is the documentation of a high number of taxa (46 genera and 31 families) and 50 species stated by the informants as medicine. This result confirms the great diversity of plants employed for therapeutic purposes and preserving traditional cultures. Figure 5 shows that 23 plant species are used for treating pain, followed by diabetes and inflammation (22 species, respectively), hypertension (16 species), fever (eight species), dyslipidemia (six species), and antiseptic (five species), as well as gastric disorders, anticancer, cough, and gout (five species, respectively).

Figure 5: Number of plant species used in each treatment

In Rawamerta, harvested medicinal plants are strongly influenced by factors, such as agricultural expansion, urbanization, and natural elements. The results showed that 95% of these plants are endemic and native to Indonesia, meaning people are more familiar with the plants available in their area than exotic species. This indicates that knowledge about medicinal plants in Rawamerta is passed down from one generation to another [13]. Furthermore, the region is reported to have a diversity of medicinal plant species but efforts to preserve its local wisdom and the plants are not yet significant. These plants tend to be affected during agricultural expansion and urbanization [14]. Several countries, such as Iran, Brazil, and South Cotabato, have implemented in situ and ex situ conservation strategies for medicinal plants in their countries. This is done to maintain the availability of medicinal plants in their country [15], [16], [17]. Therefore, the Rawamerta...
region requires special attention from the government, stakeholders, and the community. This study also suggests the indigenes and the government should carry out in situ and ex situ conservation strategies to maintain the availability of medicinal plants.

Conclusion

The use of traditional medicinal plants for treatment purposes is an important strategy to maintain knowledge about complementary and alternative medicine in the health-care system. Furthermore, ethnopharmaceutical studies provide important information for guidance in the bioprospecting of new drugs derived from plants. The present study conducted in the Rawamerta region recorded 50 plant species belonging to 46 genera distributed across 31 families that have been indicated by the interviewed healers to be able to treat various human ailments. Efforts to preserve these plants and local wisdom in the region have not been significant. Therefore, the indigenes and the government are advised to carry out in situ and ex situ conservation strategies to maintain the medicinal plants’ availability.

References


