



AN ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS WITH ANALGESIC EFFECTS IN THE PEBAYURAN REGION, BEKASI, WEST JAVA, INDONESIA

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ABSTRACT

Despite recent developments in pain therapy, the medical community still needs safe, effective, and potent analgesic drugs for the treatment of various pain conditions, especially chronic pain. This research aims to document and preserve the use of ethnomedicine to treat pain by people in the Pebayuran Region, Bekasi, West Java, Indonesia. Fieldwork was carried out from March to April 2024 using direct interviews, questionnaires, and discussions. Plant species are identified based on standard taxonomic methods, flower morphological characteristics, and where possible, using samples for comparison, as well as consultation with experts and the literature. The plant types obtained were grouped into families according to the Cronquist classification system. Plant names were checked against the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org). This research reports that 30 plant species are commonly used by people in the Pebayuran Region to treat pain. Among the various plant parts used, leaves (53.3%) are most frequently used in making medicines, followed by rhizomes (23.3%), stem (10.0%), seed (6.7%), rind and fruit (respectively 3.3%). Meanwhile, the most frequently used preparation methods were decoction (76.7%) and infusion (23.3%). The results of this research confirm that people in the Pebayuran Region still rely heavily on medicinal plants for their health care system, especially for the treatment of pain with the most frequently used parts of the leaves and their use in decoctions and infusions.

KEYWORDS: Traditional medicine, Ethnomedicinal plants, Pebayuran Region, Analgesic.

INTRODUCTION

Pain can be defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in the context of such damage.^[1] Pain is usually initiated by a painful stimulus and transmitted via specialized nerve tissue to the central nervous system, where it is then interpreted as such. Pain is a way to protect the body from possible injury.^[2] Despite the availability of adequate medications, pain remains the most challenging and devastating health problem affecting 80% of the adult population worldwide.^[3] Pain is considered a major clinical, social, and economic problem in most societies throughout the world.^[4] Untreated and persistent pain is the most widespread disorder resulting in physical damage and psychological disorders.^[5] Currently, available standard medications for pain management remain the mainstay for managing and treating this disorder. However, these drugs are associated with many side effects and

toxicities, such as gastric irritation, gastric ulcers, changes in kidney function, effects on blood pressure, liver injury, and platelet inhibition that can result in increased bleeding. NSAID use results in an increased risk of adverse cardiovascular events, particularly in patients taking COX-2 inhibitors.^[6,7] Opioid analgesics are also associated with many undesirable side effects and toxicities, including drowsiness, nausea and vomiting, pruritus, constipation, disruption of hormonal homeostasis, hearing loss, tolerance, physical dependence, addiction, and respiratory problems. Considering this, it is necessary to intensify research on medicinal plants that are claimed to be effective in managing pain.^[8]

Medicinal plants have been widely used in traditional practices by different ethnic populations throughout the world for the prevention and/or treatment of several chronic diseases. Despite the development of newer

technologies and advances in modern medicine, most of the world's population still relies on traditional systems of medicine to fulfill their medical care, especially in Indonesia.^[9] One of the Region in Indonesia that still uses herbal plants as an alternative treatment, especially to treat pain, is the Pebayuran Region. This research aims to obtain detailed information about the use of herbal plants for alternative therapy for pain in Pebayuran Region, Bekasi, West Java, Indonesia using a field survey method.

MATERIALS AND METHODS

Study Area

Pebayuran is located in Bekasi Regency, West Java, Indonesia, with an area of 96.34 km². This area has an altitude of 15 meters above sea level with an average maximum air temperature of 32°C and a minimum of 24°C. Moreover, it is located between 06°9' 35" South Latitude and 107°14' 45" East Longitude. This area is a tropical climate area that is mostly inhabited by Sundanese tribes (90%) and other tribes (10%). Vegetation in the study area is in humid conditions with an average rainfall of 200 mm/year.

Data Collection

An extensive field survey was carried out to obtain information about medicinal plants from the Sundanese tribe in the study area. To document existing information about medicinal plants from tribal practitioners, several field visits were conducted from March to April 2024 in the Pebayuran Region, Bekasi, West Java, Indonesia. During the research, ethnomedicinal information was collected from middle-aged and older tribal practitioners in their local language (Sundanese), through direct interviews, questionnaires, and discussions. Information on local names of plants, plant parts used, preparation methods and administration routes (e.g., infusion, paste,

juice and decoction) of all ethnomedicinal plants collected were recorded during the survey period.

Botanical Identification

Plant species are identified based on standard taxonomic methods, flower morphological characteristics, and where possible, using samples for comparison, as well as consultation with experts and the literature.^[10] The plant types obtained were grouped into families according to the Cronquist classification system, except for Pteridophyta and Gymnospermae.^[11] Plant names were checked against the Plant List (www.plantlist.org) and the International Plant Name Index (www.ipni.org).

Ethics Statement

All participants provided verbal consent before the interview and gave consent to publish the information they provided.

RESULTS AND DISCUSSION

This research revealed that 30 plant species are commonly used by local people to treat pain (Table 1). This shows that the study location is affordable in terms of biodiversity. Among the various plant parts used, leaves (53.3%) are most frequently used in making medicines, followed by rhizomes (23.3%), stem (10.0%), seed (6.7%), rind and fruit (respectively 3.3%). The use of leaves is reported to be easier to prepare and easier to extract active substances from them for treatment. At the same time, leaves have less effect on the mother plant.^[12] Meanwhile, the most frequently used preparation methods were decoction (76.7%) and infusion (23.3%). These results are in line with previous research which reported that the forms of traditional medicine most widely used by the community were decoctions and infusions.^[10]

Table 1: Ethnomedicinal plants, local name, part used, mode of administration, and dosage uses in Pebayuran, Bekasi, West Java, Indonesia.

No	Species	Family	Local name	Parts used	Mode of administration	Dosage of use
1	<i>Abrus precatorius</i> L.	Fabaceae	Saga	Leaf	Decoction	30 grams once a day
2	<i>Allium cepa</i> L.	Amaryllidaceae	Bawang Bombai	Rhizome	Decoction	20 grams once a day
3	<i>Allium sativum</i> L.	Alliaceae	Bawang Putih	Rhizome	Infusion	15 grams once a day
4	<i>Aloe vera</i> Burm.f.,	Asphodelaceae	Lidah Buaya	Stem	Decoction	20 grams once a day
5	<i>Alpinia galanga</i> L.	Zingiberaceae	Lengkuas	Rhizome	Decoction	10 grams once a day
6	<i>Andrographis paniculata</i> Nees	Acanthaceae	Sambiloto	Leaf	Decoction	5 grams once a day
7	<i>Annona muricata</i> L.	Annonaceae	Sirsak	Leaf	Infusion	50 grams once a day
8	<i>Carica papaya</i> L.	Caricaceae	Pepaya	Leaf	Decoction	100 grams once a day
9	<i>Ceiba pentandra</i> (L.) Gaertn.	Malvaceae	Kapuk	Leaf	Decoction	100 grams once a day
10	<i>Cinnamomum verum</i> J. Presl.	Lauraceae	Kayu Manis	Stem	Decoction	20 grams once a day
11	<i>Cordia dikotoma</i> G. Forst.	Boraginaceae	Kendal	Stem	Decoction	50 grams once a day
12	<i>Curcuma longa</i> L.	Zingiberaceae	Kunyit	Rhizome	Infusion	20 grams once a day
13	<i>Curcuma xanthorrhiza</i> Roxb	Zingiberaceae	Temulawak	Rhizome	Decoction	5 grams once a day

14	<i>Garcinia mangostana</i> L.	Clusiaceae	Manggis	Rind	Infusion	50 grams once a day
15	<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	Jarak	Leaf	Decoction	100 grams once a day
16	<i>Kaempferia galanga</i> L.	Zingiberaceae	Kencur	Rhizome	Infusion	200 grams once a day
17	<i>Manilkara zapota</i> (L.) P. Royen	Sapotaceae	Sawo	Leaf	Decoction	5 grams once a day
18	<i>Momordica charantia</i> L.	Cucurbitaceae	Pare	Leaf	Decoction	10 grams once a day
19	<i>Morinda citrifolia</i> L.	Rubiaceae	Mengkudu	Fruit	Infusion	50 grams once a day
20	<i>Moringa oleifera</i> Lamk.	Moringaceae	Kelor	Leaf	Decoction	5 grams once a day
21	<i>Myristica fragrans</i> Houtt.	Myristicaceae	Pala	Seed	Decoction	3 grams once a day
22	<i>Nigella sativa</i> L.	Ranunculaceae	Jinten Hitam	Seed	Decoction	50 grams once a day
23	<i>Paederia foetida</i> L.	Rubiaceae	Daun Kentut	Leaf	Decoction	5 grams once a day
24	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pandan	Leaf	Infusion	5 grams once a day
25	<i>Persea americana</i> Mill.	Lauraceae	Alpukat	Leaf	Decoction	100 grams once a day
26	<i>Piper betle</i> L.	Piperaceae	Sirih	Leaf	Decoction	10 grams once a day
27	<i>Sauropus androgynus</i> Merr.	Phyllanthaceae	Katuk	Leaf	Decoction	10 grams once a day
28	<i>Syzygium polyanthum</i> (Wight) Walpers	Myrtaceae	Salam	Leaf	Decoction	2 grams once a day
29	<i>Tinospora crispa</i> L.	Menispermaceae	Baratawali	Leaf	Decoction	80 grams once a day
30	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Jahe	Rhizome	Decoction	10 grams once a day

CONCLUSIONS

The results of this research confirm that people in the Pebayuran Region still rely heavily on medicinal plants for their health care system, especially for the treatment of pain with the most frequently used parts of the leaves and their use in decoctions and infusions.

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