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ETHNOMEDICINAL PLANT EMPLOYMENT BY THE BUKET ETHNIC IN SARAWAK, BORNEO

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Abstract

Ethnopharmacological relevance:

Sarawak, also known as the 'Land of the Hornbills', is culturally diverse. The region houses numerous ethnic groups with unique traditions, languages, and customs. Buket, an ethnic minority in Sarawak, is renowned for employing medicinal plants as a key component of its primary healthcare system. Nevertheless, regular medicinal plant traditional knowledge updates are necessary to preserve indigenous wisdom from being lost due to urbanisation.

Aim of the study:

The study aims to assess and document the ethnomedicinal knowledge of the Buket tribe, which encompasses traditionally utilised medicinal plant species, preparation methods, and plant parts. The current study also focuses on the comprehension of the indigenous community regarding the identified medicinal plant applications.

Materials and methods:

The present study gathered data through comprehensive household surveys, in-depth interviews with respondents, focus group discussions, and field observations involving 35 respondents. Subsequently, the information was interpreted through use value (UV) and fidelity level (FL).

Results:

Following a thorough assessment, only 35 individuals were deemed knowledgeable and implemented traditional medicine. Most respondents (80%) were elderly and did not receive education. The results also

demonstrated that 30 medicinal plants available in the study area were employed to treat several ailments. The plants from the Solanaceae were employed the most as medicinal resources, followed by the Fabaceae family. The Buket tribe primarily utilises leaves to prepare medicine, while the shoots, stems, fruits, and roots were not commonly employed. The respondents also reported that the herbal preparations were mostly administered orally and topically. Although the community predominantly prepare decoctions, they also directly ingest the plant components. The Buket tribe employs several medicinal plants

in treating various illnesses, including fever, gastrointestinal disorders, hypertension, migraines, abdominal pain, and muscle discomfort. *Orthosiphon staminius*, *Tradescantia chrysophylla*, *Kalanchoe pinnata*, and *Plantago asiatica* L. recorded the most significant UV at 0.94. On the other hand, *Curcuma zedoaria* Roscoe, *Dyera costulata*, and *Tradescantia chrysophylla*, revealed the highest FL for treating diabetes (97.1%), chicken pox (94.3%), and fever (91.4%), respectively. The findings offer a concise overview of the genus, species, and respective applications of the medicinal plants.

Conclusion:

The residents of the Uma Ukit village demonstrated a sound understanding of the medical properties of the medicinal plants growing in the study area. The villagers have also been using the plants for generations. The present study findings could significantly assist in preserving the importance of traditional knowledge, hence preventing its loss.

Keywords Buket ethnic, medicinal plants, traditional medicine knowledge, Sarawak, Borneo, indigenous

Highlights

- The research findings unveiled the noteworthy contribution of traditional medicinal plants, and the pertinent knowledge possessed by the Buket ethnic minority in Sarawak, Borneo.
- A total of 30 medicinal plant species for medicinal uses were documented for treating 18 ailments by Buket people in Uma Ukit.
- Solanaceae and Fabaceae Solanaceae have been widely recognized for their significant contributions to medicinal uses.
- Local medicinal plants have been found to effectively treat a range of common ailments such as fever, stomachache, high blood pressure, joint pain or sprains, diabetes, and laceration problems.

Introduction

Distributed across 90 countries, the indigenous population surpasses 476 million individuals, constituting approximately 6.2% of the global citizens (UNDP, 2021). Although the indigenous communities encompass 5,000 distinct cultures, they comprise over 80% of the socioeconomically disadvantaged population, lacking access to social resources and economic assistance (United Nations Development Programme, 2021).

Borneo is the third-largest tropical island in the world. The region is also known for its remarkable biodiversity, which has persisted since the Miocene (Kocsis et al., 2022; Zafar et al., 2022). Sarawak, the largest state in Malaysia, is located in the northwest region of Borneo. Sarawak houses 34 ethnic groups, comprising approximately three million individuals dispersed throughout the state [Article 161A of the Federal Constitution on the Indigenous Races of Sarawak-The Interpretation (Amendment) Bil. 2022 passed 15 Feb 2022]. The ethnic groups in Sarawak include the Iban, Malay, Bidayuh, Chinese, Melanau, Naram, Sihan, Sa'ban, Lisum, Logat, and Buket.

The Buket minority is one of the globally lesser-known ethnic groups in Sarawak, comprising only 376 individuals (Bernama, 2022). Information on the specific history of the Buket community and culture is limited even though their history could be traced back to the pre-colonial era (Aghakhanian

et al., 2015). Nonetheless, the Buket community is fascinating with vibrant individuals residing in the remote mountainous areas of Southeast Asia (Hoh et al., 2022). The ethnic group boasts a rich cultural heritage, distinct traditions, and a unique way of life (Curnoe et al., 2016).

Various plant species grow in the Buket village. Although the Uma Ukit villagers extensively utilise plants as a food source and for medicinal purposes, documentation regarding the ethnobotanical aspect of the medicinal plants used is scarce. Preserving indigenous knowledge is crucial given the scarcity of contemporary research on the ethnobotanical expertise of minorities in Sarawak. Documenting traditional knowledge is also critical in preserving cultural heritage, ethnopharmacological foundations for drug research and discovery exploration, and conserving biological diversity.

This study is the first to comprehensively investigate the ethnobotanical knowledge of a particular indigenous Buket community. The current study documented the medicinal plant species employed by the Buket community, focusing on the prevalent species in the region and their respective applications in therapeutic contexts. The benefits of employing ethnomedicinal plants as an alternative or complementary approach to modern medicine and their potential for further research were also discussed. The present study aimed to provide information on the traditional medicinal plants utilised by the Buket people in the Uma Ukit village and their unique application characteristics. This study also documented the diseases that could be treated by herbal plants found in the Uma Ukit village.

Materials and Methods

Study area

The current study was performed at the Uma Ukit Sungai Koyan, Asap Belaga, Sarawak, the only remaining longhouse of the Buket tribe. The Buket community, also known as Ukit, are a sub-group of the Kalimantan citizens. Residing in Sarawak, Malaysia (see Figure 1), the tribe faces a high extinction risk with a population of only 376 (see Figure 2). The precarious situation could be attributed to historical events, such as the loss of numerous tribesmen in the past and the impact of intermarriage with other tribes, contributing to the further decline in its population.

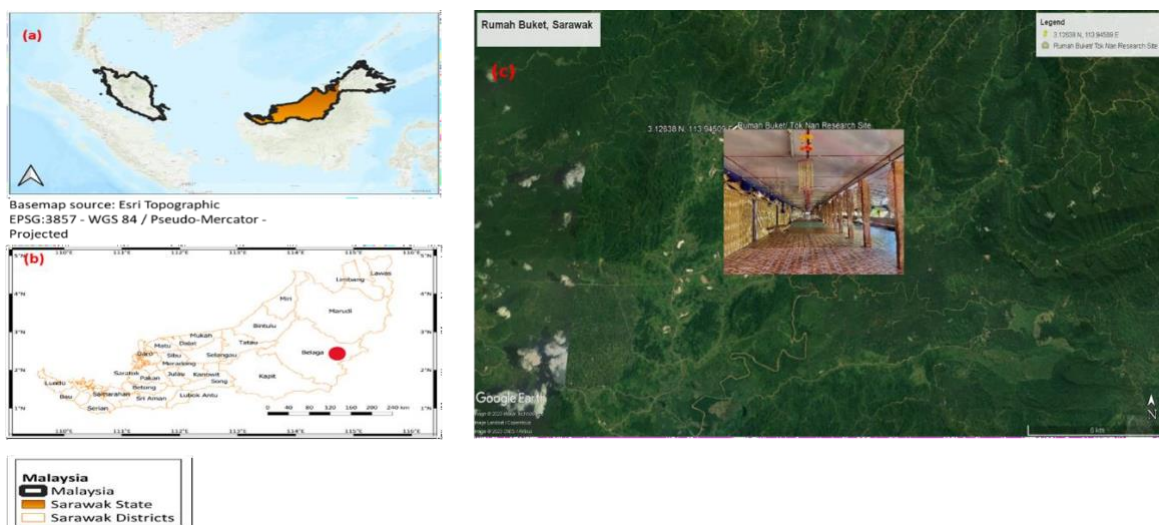


Figure 1: A map of the study area:(a) Sarawak, East Malaysia (orange),(b) Belaga district, Sarawak (red dot), and (c) study area



Figure 2: The local community residing in the Buket Longhouse

Despite having access to contemporary medical facilities, including public clinics, the Buket tribe maintains a notable bond with nature. The indigenous tribe have also traditionally depended on plants for medicinal purposes. Furthermore, the Buket minority have been passing down the knowledge of using medicinal plants to treat various ailments through generations.

The proximity of the Uma Ukit village to the forest provides the residents access to a diverse range of plants. The community is also known for its agricultural products, primarily rice and other crops. Moreover, the Buket community is relatively isolated from urban areas (150 km from Bintulu), which has aided in preserving their traditional knowledge and practices. Consequently, Uma Ukit is an ideal location for studying the traditional utilisation of medicinal plants by the Buket tribe.

Data collection

The field research component of this study included collecting data on the utilisation of ethnomedicinal plants in Buket, Sarawak. The face-to-face interviews, field observation, and group discussions were conducted in the Buket community residing in Uma Ukit, Sungai Koyan, Asap Belaga Sarawak, from March to July 2023 (see Figures 3 and 4). Only respondents with a comprehensive understanding of traditional medicinal practices were involved, which were identified through initial interviews or oral examination. The present study also established a questionnaire to obtain the demographic description of the 35 respondents identified, including their education level, age, gender, and occupation. Most of the respondents were elderly individuals who occasionally use traditional medicinal plants. Only one respondent reported significant knowledge as a traditional medicinal practitioner.

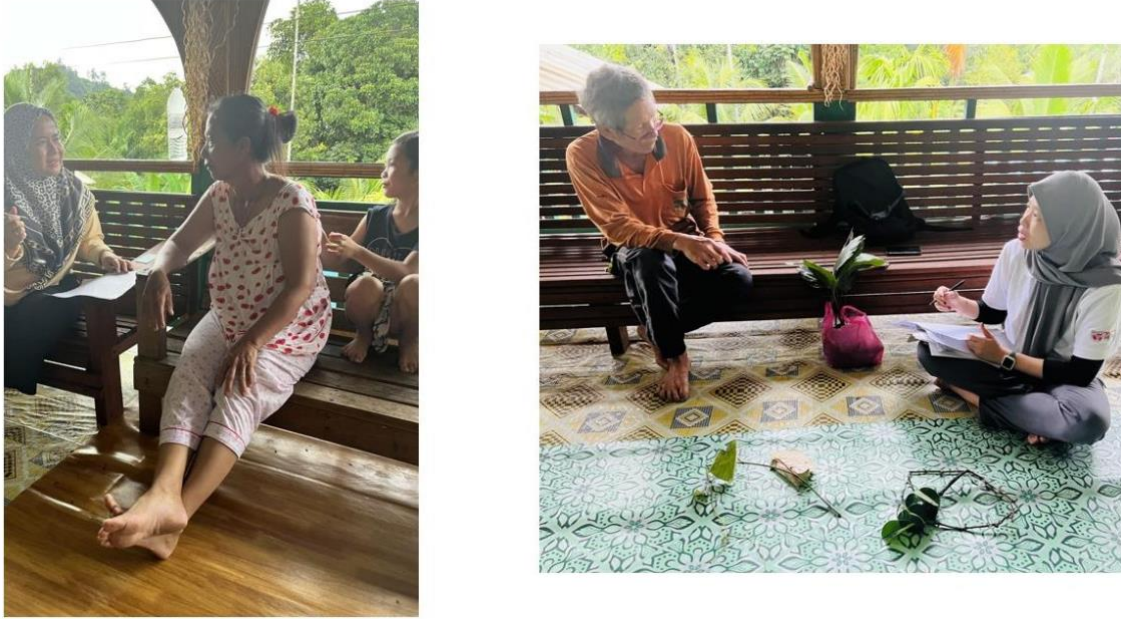


Figure 3: The face-to-face interviews with the Buket community



Figure 4: Respondents demonstrating and discussing the applications of some of the medicinal plants collected

During data collection, the respondents were asked about their familiarity with the medicinal plants they employ. Local names and graphic representations of the plants were utilised during the interview, with translator assistance. The local names, therapeutic purposes, ailments treated, components utilised, and preparation methods of the medicinal plants were recorded.

Field observations were conducted in areas primarily used to cultivate the medicinal plants utilised by the Buket community. The approach was utilised to obtain accurate data regarding the identification, distribution, and conservation status of the plants. Subsequently, group discussions were organised at the public veranda of the longhouse, which involved five to seven respondents and residents. The discussions were conducted to identify the traditional medicinal system, management, and methods employed to preserve and pass the knowledge from one generation to the next. A checklist of questions established during the previous face-to-face interviews was employed during the group discussions.

The present study reviewed literature offering components on ethnomedicinal plants in Malaysia. Articles discussing the utilisation of traditional plants and their phytochemistry and pharmacological properties were also included. The current study employed various databases as a resource, including PubMed, Science Direct, and Scopus.

Species identification

Species identification was performed to verify the samples obtained during the interviews. Mr Muaish bin Sait from the Faculty of Agricultural and Forestry Sciences, Universiti Putra Malaysia (UPM), Bintulu Campus, Sarawak, classified the plants via field identification and scientific names. The botanical nomenclature of each species was authenticated via the Plant List (<http://www.theplantlist.org>).

Ethical considerations

The present study adhered to the guidelines set by the Sarawak Biodiversity Centre (SBC). A permit (*Permit No.: SBC-2023-RDP-47-FAB*) for research and development was obtained before commencing the study. Furthermore, informed consents were procured from the respondents prior to the interviews and surveys. The current study did not harm the respondents, and the information obtained was kept confidential.

Data analysis

The use value (UV) refers to the inherent value of a particular medicinal plant species used by the Buket community. In this study, the UV value of each species was determined by dividing the sum of the use values (UV_{is}) of a specific medicinal species by the total number of informants (N_i) (see Equation 1). Subsequently, the UV was computed based on the methodology proposed by Hoffman and Gallaher (2007).

$$UV = \frac{\sum UV_{is}}{N_i} \quad (\text{Eq. 1})$$

The fidelity level (FL) represents the percentage of specific medicinal plant species employed to treat specific diseases within the designated study area. The FL index in this study was established according to Equation 2.

$$FL (\%) = \frac{N_p}{N} \times 100 \quad (\text{Eq. 2})$$

where N_p denotes the number of respondents recorded utilising a medicinal plant species to treat a specific illness, and N represents the total number of respondents citing identical plant species for different treatment types.

Results and Discussion

The demographic and traditional knowledge status of the Buket villagers

Approximately 150 Buket residents were approached at the Uma Ukit Longhouse during the course of this study. The residents were primarily interviewed during the weekends to coincide with their holiday. Moreover, the Buket community often gather on the public veranda at their longhouse to engage in social interactions during weekends.

Before commencing the interviews, group discussions, and field observations, the Buket villagers were provided with a detailed explanation of the research objectives. The community was also inquired about their engagement in traditional medicinal plants. Resultantly, only 35 individuals, 28 males and 7 females, met the research criteria and were involved as respondents (see Table 1).

Table 1: The demographic of the respondents (N = 35)

Factor	Category	Number of respondents	Percentage of respondents (%)
Gender	Male	28	80
	Female	7	20
Age (years)	30–39	2	5.7
	40–49	5	14.3
	50–80	28	80
Education level	None	24	68.6
	Primary	8	22.9
	Secondary	3	8.6
	Tertiary	0	0
Ethnicity	Buket	35	100
Knowledge passed on	Yes	33	94.3
	No	2	5.7

Although the respondents possessed knowledge and had been practicing traditional medicine for over five years, only one individual relied on traditional medicine as the primary healthcare source. A majority of the respondents in this study were males. The individuals predominantly relied on traditional medicine, as they believed certain ailments could be treated more effectively with traditional methods than modern medicine.

The respondents in the current study consisted of three age groups: two respondents were young (30–39) (5.7%), five were middle-aged (40–49)(14.3%), and 28 respondents were the elderly (50–80) (80%)category. Most of the respondents involved in this study were elders, which indicated that the younger community possessed insufficient medicinal plant knowledge. Previous studies also documented that older individuals serve as the primary repositories of knowledge involving medicinal plants (Torres-Aviles, W. et al., 2016; Rahayu et al., 2020; Navia et al., 2021).

Traditional knowledge and practices are often ignored or forgotten due to rapid modernisation and globalisation. The results revealed the importance of preserving traditional knowledge and its role in healthcare systems. The traditional knowledge of ethnomedicinal plants is still being passed down and applied by the Buket community. Consequently, documenting the knowledge is crucial to prevent it from being lost.

The diversity of the medicinal plants employed by the Buket community

The respondents in this study identified 30 medicinal species from 21 plant families. Table 2 summarises how the Buket community employ the identified plants. The plants in the Solanaceae family were the most utilised (16.7%) followed by the Fabaceae (10%), Lauraceae, Piperaceae, and Zingiberaceae families (6.7%). The remaining plant families identified in this study were categorised based on the species they encompass.

Table 2: The local and scientific names, families, and availability of the medicinal plants reported by the respondents

No.	Local name	Scientific name	Plant family	Availability
1.	Daun kepapak/Buah pipit	<i>Solanum torvum</i>	Solanaceae	Cultivated
2.	Daun buah kerima	<i>Litseagarciae</i>	Lauraceae	Cultivated and exotic
3.	Paku Bura/Paku Uban	<i>Nephrolepisacutifolia</i>	Nephrolepidaceae	Wild
4.	Daun Medung/Pucuk betik	<i>Carica papaya</i>	Caricaceae	Cultivated
5.	Daun kerengang/Daun gelenggang	<i>Cassia senna</i>	Fabaceae	Wild
6.	Daun sirih	<i>Piper betle</i>	Piperaceae	Cultivated
7.	Pulut kayu jelutong	<i>Dyeracostulata</i>	Apocynaceae	Wild and cultivated
8.	Kulit buah kerima	<i>Litseagarciae</i>	Lauraceae	Cultivated, wild, and exotic
9.	Paku sonai	<i>Matteuciastruthiopteris</i>	Onocleaceae	Wild
10.	Daun durian belanda	<i>Annona muricata</i> L.	Annonaceae	Cultivated
11.	Daun Pahang	<i>Capsicum annuum</i>	Solanaceae	Cultivated
12.	Daun jambu batu	<i>Psidium guajava</i>	Myrtaceae	Cultivated
13.	Mahkota dewa	<i>Phaleria macrocarpa</i>	Thymelaeaceae	Cultivated
14.	Akar ubat mabuk	<i>Fibraureachloroleuca</i>	Menispermaceae	Exotic
15.	Misai kucing	<i>Orthosiphon staminius</i>	Lamiaceae	Cultivated
16.	Telinga kera	<i>Tradescantia(T.)chrysophylla</i>	Commelinaceae	Cultivated
17.	Daun setawar	<i>Kalanchoe pinnata</i>	Crassulaceae	Cultivated and wild
18.	Daun senduk	<i>Plantago asiatica</i> L.	Plantaginaceae	Cultivated and wild
19.	Kunyit putih	<i>Curcuma(C.) zedoaria Roscoe</i>	Zingiberaceae	Cultivated, wild, and

				exotic
20.	Lada hitam	<i>Piper nigrum</i> L.	Piperaceae	Cultivated
21.	Buah tomato	<i>Solanum lyopersicum</i> L.	Solanaceae	Cultivated
22.	Daun Aloe vera	<i>Aloe vera</i> (L.) Burm. f.	Asphodelaceae	Cultivated
23.	Gambir	<i>Uncaria acida</i> (W.Hunter) Roxb.	Rubiaceae	Wild and exotic
24.	Daun langsung	<i>Lansium domesticum</i> Corrêa	Meliaceae	Cultivated
25.	Tembakau	<i>Nicotiana tabacum</i> L.	Solanaceae	Cultivated, wild, and exotic
26.	Pokok cili	<i>Capsicum annuum</i> L.	Solanaceae	Cultivated
27.	Daun kupang	<i>Senna alata</i> (L.) Roxb.	Fabaceae	Cultivated
28.	Daun semalu	<i>Mimosa pudica</i> L.	Fabaceae	Wild
29.	Akar kunyit	<i>C. longa</i> L.	Zingiberaceae	Wild and exotic
30.	Nangka	<i>Artocarpus heterophyllus</i> Lam.	<i>Moraceae</i>	Cultivated

Among the distinct traditional plant families in the study area, several medicinal plants were significantly employed, contributing to the local healthcare system. The information was consistent with the findings reported by Jain et al. (2011), Kindie et al. (2021), and Chidambaram et al. (2022). Furthermore, previous studies indicated that the plants belonging to the Solanaceae family were the predominant species utilised in traditional medicine.

A majority of the respondents reported frequently gathering medicinal plants from nearby locations, such as forests within walking distance of their homes. Moreover, almost all respondents were aware of the plants and reported frequently utilising them for treating illnesses. Among the medicinal plant species identified by the respondents in this study, 15 were exclusively cultivated, one was exotic, one was cultivated and exotic, four were wild, three were wild and cultivated, and three were cultivated, wild, and exotic. The occurrence of the identified species in the study area also demonstrates the abundance of medicinal plants in the location.

Plant component employed and preparation method

Hoffman and Gallaher (2007) suggested that plant component computation could result in the effective identification of primary plant parts utilised for therapeutic purposes. The Buket tribe primarily employ medicinal plant leaves as their medicinal resource, as they are aware of the curative benefits of the component and its ease of collection and preparation. The community reported relying extensively on the leaves of 18 plant species for diverse medicinal applications (see Table 3). On the other hand, the utilisation of shoots, stems, fruits, and roots was relatively infrequent.

Table 3: The plant parts and utilisation methods of the identified medicinal plants

No.	Plant species	Part employed	Preparation method	Administration
1.	<i>Solanum torvum</i>	Leaves	Squeezed and rubbed on the stomach or affected area	External
2.	<i>Litsea garciae</i>	Leaves	Wrapped in stone and applied on the stomach	External
3.	<i>Nephrolepis acutifolia</i>	Shoots	Boiled and the water is consumed	Internal
4.	<i>Carica papaya</i>	Leaves Shoot	Boiled and the water is consumed or ingest the leaves	Internal
5.	<i>Cassia senna</i>	Leaves	Squeezed and rubbed on the body or boiled and the water is consumed	Internal and external
6.	<i>Piper betle</i>	Leaves	Squeezed and rubbed on the body	External
7.	<i>Dyera costulata</i>	Leaves	Rubbed on the affected area	External
8.	<i>Litsea garciae</i>	Fruit skin	Burned and applied to pus	External
9.	<i>Matteuccia struthiopteris</i>	Leaves	Rubbed on the body	External
10.	<i>Annona muricata</i>	Leaves	Boiled and the water is consumed	Internal
11.	<i>Capsicum annuum</i>	Leaves	Squeezed and rubbed on the body	External
12.	<i>Psidium guajava</i>	Leaves	Squeeze, boiled and the water is consumed	Internal
13.	<i>Phaleria macrocarpa</i>	Fruit	Sliced, boiled, and the water is consumed	Internal
14.	<i>Fibraurea chloroleuca</i>	Roots	The outer and inner skins are peeled or chewed and discarded	External and internal
15.	<i>Orthosiphon stamenius</i>	Leaves	Boiled and the water is consumed	Internal
16.	<i>Tradescantia chrysophylla</i>	Leaves	Boiled and the water is consumed	Internal
17.	<i>Kalanchoe pinnata</i>	Leaves	Boiled and the water is consumed or squeezed and rubbed on the affected area	Internal and external
18.	<i>Plantago asiatica L.</i>	Leaves	Boiled and consumed	Internal
19.	<i>Curcuma zedoaria Roscoe</i>	Roots	Boiled or consumed directly	Internal

20.	<i>Piper nigrum</i> L.	Fruit	Boiled and the water is consumed	Internal
21.	<i>Solanum lysopersicum</i> L.	Fruit	Pounded and consumed	Internal
22.	<i>Aloe vera</i> (L.) Burm. f.	Leaves	The extract is applied on the affected area	External
23.	<i>Uncaria acida</i> (W.Hunter) Roxb.	Roots	Water in roots is consumed	Internal
24.	<i>Lansiumdomesticum</i> Corrêa	Leaves	Boiled and the water is consumed	Internal
25.	<i>Nicotiana tabacum</i> L.	Leaves	Pounded and applied on the affected area	External
26.	<i>Capsicum annuum</i> L.	Fruit	Pounded and applied on affected area	External
27.	<i>Senna alata</i> (L.) Roxb.	Leaves	Pounded and applied on the affected area	External
28.	<i>Mimosa pudica</i> L.	Stem	Boiled and the water is consumed	External
29.	<i>Curcuma longa</i> L.	Roots	Pounded, boiled, and consumed	Internal
30.	<i>Artocarpus heterophyllus</i> Lam.	Fruit	Consumed directly	Internal

The Buket tribe employed several plant part processing techniques prior to using them as herbal remedies. Preparing decoctions was documented as the most common method utilised by the respondents in this study. The information suggested that the local community was well-versed in traditional preparation methods, which was critical in ensuring the efficacy of the plants (Mahwasane et al., 2013). A total of 15 medicinal plants identified in the current study were prepared as decoctions, concentrated solutions obtained by heating or boiling (see Table 3), while 11 other plants were pounded or squeezed. Other preparation methods include consuming the plants raw (2), burning them (1), and wrapping them with stone (1).

The UV of important medicinal plants

The current study determined the significance of the medicinal plants utilised by the Buket community by computing the UV obtained according to the formula outlined by Hoffman and Gallaher (2007). The UV levels of frequently employed medicinal plants are more significant than less utilised medicinal plants. The UV of the medicinal plants identified in this study varied between 0.23 and 0.94 (see Figure 5).

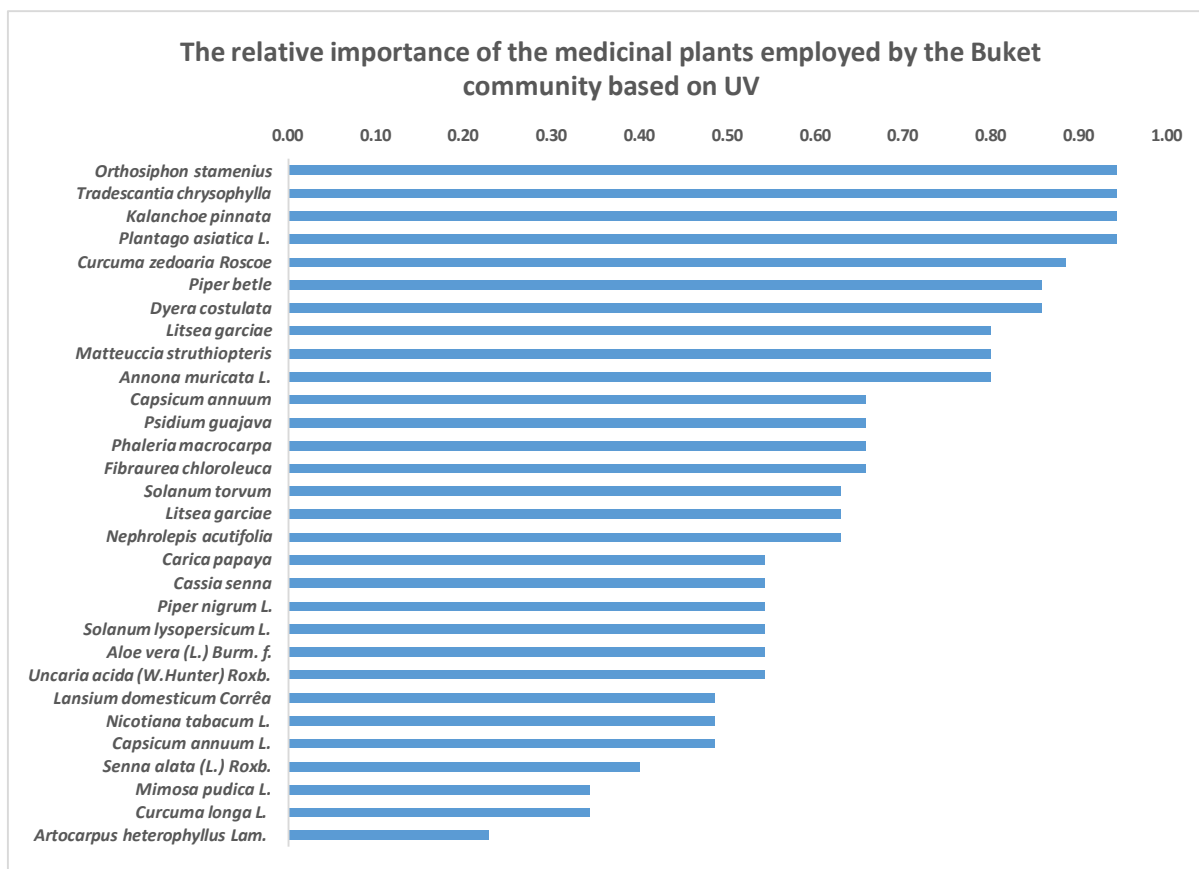


Figure 5: The relative importance of the medicinal plants employed by the Buket community based on UV

Orthosiphon staminius, *Tradescantia chrysophylla*, *Kalanchoe pinnata*, and *Plantago asiatica L.* recorded the highest UV levels, while *Artocarpus heterophyllus Lam* had the lowest. *C. zedoaria Roscoe* (0.89), *Cassia senna* (0.86), *Piper betle* (0.86), *Dyera costulata* (0.86), *Litsea garciae* (0.80), *Matteuccia struthiopteris* (0.80), and *Annona muricata L.* (0.80) also documented significant values.

In this study, *O. staminius* had a 0.94 UV. Previous reports noted that the species is commonly employed as a medicinal plant in Southeast Asian countries, including Thailand, Indonesia, and Malaysia (Nguanchoo et al., 2023; Rahmawati et al., 2020; Zubaidah et al., 2020; Ramli et al., 2021; Abu Bakar et al., 2016). The plant is also abundantly grown for its therapeutic attributes to treat numerous illnesses, such as fever, diabetes, oedema, inflammation, and jaundice.

T. chrysophyllais also extensively employed as traditional medicine by Southeast Asians. The Buket tribe commonly consume the plant, locally known as *telinga kera*, fresh or dried to treat fever and relieve common urinary disorders. The dried *T. chrysophylla* is also utilised for its anti-inflammatory, antioxidant, and antibacterial attributes. On the other hand, *T. chrysophylla* roots and leaves are believed to possess kidney disorder and insect bite healing properties, respectively (Guzmán et al., 2014; Butnariu et al., 2022; Abu Bakar et al, 2023). Nevertheless, clinical data substantiating the claims are unavailable.

Ethnobotanical reports noted similar medicinal applications for *K. pinnata* and *P. asiatica L.* For and inflammation. Similarly, Lin and Kan (1990) recorded *P. asiatica L.* utilisation for its wound healing properties. The species is regularly utilised in Asian traditional medicine due to its antipyretic,

antitussive, and diuretic characteristics. In this study, *K. pinnata* and *P. asiatica* L. exhibited significant UV values of 0.94 each.

Herbal therapy and fidelity level (FL) of the identified medicinal plants

The Buket community employed different plants to treat similar illnesses, indicating that several plants could treat an ailment effectively (see Table 4). The Buket community utilised six plant species to treat fever, three plants each for stomach ache, high blood pressure, joint pain or sprains, diabetes, and laceration, two each for low blood pressure, boils, diarrhoea, general health, and one species each was utilised to increase milk production, improve blood circulation, and ease urination, treat haematochezia, chicken pox, and constipation and for detoxification.

Table 4: The fidelity level of the medicinal plant herbal therapies in the study area

Ailment	Plant species (FL, %)
Fever	<i>Solanum torvum</i> (77.1)
	<i>Piper nigrum</i> (65.7)
	<i>Piper betle</i> (60.0)
	<i>Kalanchoe pinnata</i> (74.3)
	<i>Orthosiphon staminius</i> (85.7)
Increase milk production	<i>T. chrysophylla</i> (91.4)
	<i>Nephrolepis acutifolia</i> (71.4)
Low blood pressure	<i>Carica papaya</i> (60.0)
	<i>Litsea garciae</i> (42.9)
Detoxification	<i>Fibraurea chloroleuca</i> (28.6)
Stomach ache	<i>Fibraurea chloroleuca</i> (42.9)
	<i>Lansium domesticum</i> Corrêa (25.7)
	<i>Uncaria acida</i> (W.Hunter) Roxb. (82.9)
Haematochezia	<i>Fibraurea chloroleuca</i> (28.6)
Insect bite	<i>Piper betle</i> (31.4)
Chicken pox	<i>Dyera costulata</i> (94.3)
Boil	<i>Litsea garciae</i> (34.3)
	<i>Capsicum annuum</i> L. (20.0)
Constipation	<i>Cassia senna</i> (14.3)
High blood pressure	<i>Annona muricata</i> (25.7)
	<i>Plantago asiatica</i> L. (82.9)
	<i>Phaleria macrocarpa</i> (65.7)
Diarrhoea	<i>Psidium guajava</i> (11.4)
	<i>Carica papaya</i> (5.7)
Improve blood circulation	<i>Litsea garciae</i> (42.9)
General health	<i>C. longa</i> L. (40.0)
	<i>Solanum lysopersicum</i> L. (77.1)
Joint pain or sprains	<i>Mimosa pudica</i> (17.1)
	<i>Kalanchoe pinnata</i> (71.4)
	<i>C. zedoaria</i> Roscoe (77.1)
Diabetes	<i>C. zedoaria</i> Roscoe (97.1)
	<i>Ortosiphon staminius</i> (5.7)
	<i>Artocarpus heterophyllus</i> Lam. (2.9)

Ease urination	<i>T. chrysophylla</i> (37.1)
Laceration	<i>Senna alata</i> (L.) Roxb. (28.6) <i>Aloe vera</i> (L.) Burm. f. (22.9) <i>Nicotiana tabacum</i> (48.6)

The results indicated that eight plant species were utilised by the Buket minority to treat different ailments. For instance, *C. zedoaria* Roscoe leaves were employed to treat diabetes and joint pain or sprains. Similarly, *Piper betle* L. could alleviate fever and insect bite symptoms, while *Litsea garciae* is commonly utilised to treat low blood pressure and boils and improve blood circulation. The findings indicated that the employment of the species was more significant than the other plants.

Fidelity level (FL) is a valuable indicator for assessing the value of a species in treating a particular ailment. The FL values of the 30 plant species identified in this study varied between 2.9% and 97.1%. *C. zedoaria* Roscoe was the most efficient (97.1%) in treating diabetes, while *Dyera costulata* (94.3%) and *T. chrysophylla* (91.4%) recorded the ideal efficiency in treating chicken pox and fever, respectively.

Among the ethnomedicinal plants available in the study area, the Buket community regularly utilise *C. zedoaria* Roscoe. The plant has anti-inflammatory attributes and is frequently employed in inflammatory skin condition treatments, such as eczema and psoriasis (Rahaman et al., 2020). Curcumin is the active ingredient in *C. zedoaria* Roscoe, which has demonstrated antioxidant and anti-cancer attributes (Deepa et al., 2014). Hewlings and Kalman, (2017) reported that curcumin effectively reduced the risks of some cancers. The substance has also been employed to treat chronic health conditions, such as diabetes and heart disease. The findings also demonstrated the efficacy of the medicinal plants identified in the current study in treating common health issues.

Some of the medicinal plant species identified in the current study exhibited FL values under 10% in treating multiple illnesses, such as *A. heterophyllus* Lam. (2.9%) and *C. papaya* (5.7%). The limited number of plant species growing in the study area might contribute to the low FL. The data also suggested that the Buket community had a lack of knowledge on utilizing the herbal remedies.

Conclusion

The findings in the current study documented the utilisation of medicinal plants by the Buket community residing in Uma Ukit, Sarawak, Malaysia. A total of 30 medicinal plant species were identified, which belonged to 21 distinct families. Solanaceae and Fabaceae were the most prominent families of medicinal plants employed by the tribe in the study area.

The Uma Ukit residents utilised numerous plant species to treat fever, stomachache, high blood pressure, muscles and joints pain or injury, and diabetes. Predominantly, the Buket community employ leaves, with decoction being the primary preparation method. The findings also revealed possible functions of the medicinal plants employed in the Uma Ukit village. The UV and FL of the medicinal plant species procured in the current study could aid in enhancing plant conservation efforts and facilitate pharmacological research for novel drug development.

The results indicated that the Buket community has an excellent understanding of the medicinal plants and their properties. Furthermore, the tribe has been employing the plants for medicinal purposes for generations. The information procured in this study could serve as a basis for the

conservation and sustainable management of ethnomedicinal plant resources in the study area, highlighting the importance of traditional knowledge, its role in healthcare systems, and the need to document it before it is lost.

Credit Author Statement

Fauziah Abu Bakar: Conceptualization, Methodology, Data Curation, Writing - Original draft preparation. **Mohamad Maulana Magiman:** Investigation, Methodology, Writing – Reviewing and Editing. **Zahora Ismail:** Methodology, Writing – Reviewing and Editing. **Elena Gregoria Chai Chin Fern:** Writing – Reviewing and Editing

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Declaration of Conflicting Interests

The authors declare no potential conflicts of interest.

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