

## Research Article

# An Ethnobotanical Study of the Medicinal Plants Used as Anti-Inflammatory Remedies in Gampaha District, Western Province, Sri Lanka

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The application of traditional medicinal plants as anti-inflammatory remedies has been practiced in Sri Lanka for thousands of years. Although there is a rich reserve of indigenous knowledge of medicinal plants, the preservation and the scientific validation of these claims are still in its infancy. Thus, the study was carried out in one of the administrative areas of Sri Lanka known as Gampaha District to assess the significance and contribution of medicinal plants in inflammatory conditions. The data were collected through semistructured and open-ended interviews from 458 volunteers. Ethnobotanical data were analyzed using the relative frequency of citation (RFC), family importance value (FIV), and use value (UV). Out of the total participants, 50.7% claimed the use of medicinal plants for the treatment of inflammatory conditions such as fever, cough, asthma, swellings, and pain in the joints. A total of 43 medicinal plants belonging to 28 plant families were mentioned, out of which *Coriandrum sativum* (RFC = 0.23) was the most cited species. The most cited plant family was Fabaceae, and the family importance value was highest in Apiaceae. The majority of the nonusers of the herbal remedies mentioned that they would shift to herbal products if scientific information is available on the efficacy of these products.

## 1. Introduction

Inflammation is a pathophysiological response to injury, infection, or irritants and is characterized by heat, redness, pain, swelling, and disturbed function of the organs. Since ancient times, inflammatory disorders and related diseases have been treated with plants and plant-derived formulations [1]. Over the last two decades, a significant amount of evidence has emerged indicating that chemically diverse classes of plant secondary metabolites are of potential interest for therapeutic interventions in several inflammatory diseases. A number of studies revealed the ability of plant extracts or plant secondary metabolites to control the levels of various inflammatory cytokines or inflammatory mediators including IL-1, IL-6, IL-10, TNF- $\alpha$  [2], NF- $\kappa$ B, NO, iNOS, COX-2 [3], and 5-LO [4].

Plants and their products have been systematically used in Sri Lanka for treating illnesses for over a thousand years. Among the native flora of Sri Lanka, more than 1400 plants are used in indigenous medicine [5], and a large number of plants are extensively used to alleviate the pathological conditions associated with inflammation [6]. However, there has been a dearth of published information on ethnobotanical studies on anti-inflammatory remedies within the Sri Lankan context.

Four systems of traditional medicine have been adopted in Sri Lanka: Ayurveda, Siddha, Unani, and Deshiya Chikitsa. The Ayurveda and Deshiya Chikitsa systems use mainly plant and herbal preparations for the treatment of diseases [7]. Different regions of the country have their unique traditional medicine systems (known as Deshiya Chikitsa) and practitioner pedigrees. Out of these different

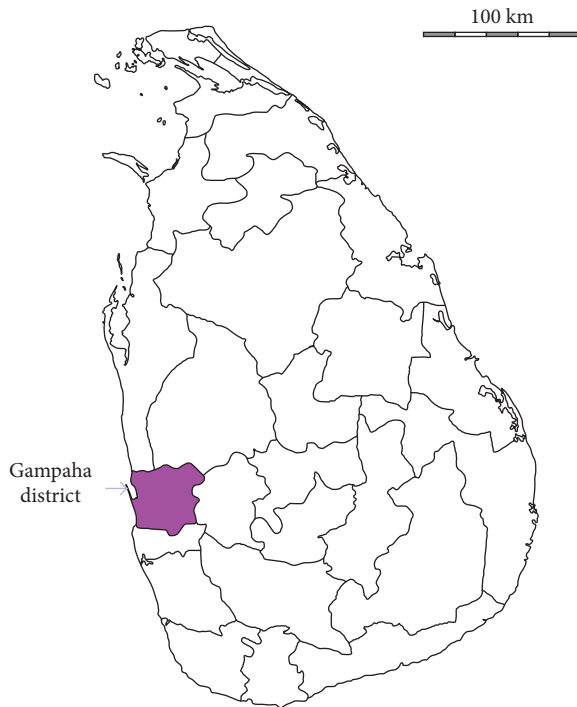


FIGURE 1: Location of Gampaha District.

regions, Gampaha District is considered as the home for several well-known traditional practitioners in the country. Although the modern health care facilities are readily available in this area, traditional medicinal practices are quite popular and widely accepted by the people. Ten Ayurvedic hospitals governed under the Ministry of Indigenous Medicine are located within the district to meet this demand [8]. Therefore, the study area for this research has a rich potential for utilization and consumption of medicinal plants. However, an in-depth study has not been pursued yet to assess the significance and contribution of medicinal plants/herbal therapeutics to the day-to-day life of the inhabitants of Gampaha District. In order to fill this gap in knowledge, the traditional medicinal uses of plants for inflammatory conditions have been documented in the form of an ethnobotanical inventory in order to assess the popularity and usage of medicinal plants in the study area.

## 2. Materials and Methods

**2.1. Study Area.** Gampaha District is located in the Western Province of Sri Lanka (Figure 1) and has an area of 1,387 km<sup>2</sup>. The district is divided into 13 divisional secretariat divisions, which are further subdivided into 1,177 *grama niladhari* divisions. There are 1,784 villages, and the total population of the district is reported as 2,280,860 [9]. According to the geographical location, this district belongs to the coastal plain and shows plain geographical characteristics in most of the areas and mountainous geographical characteristics in northern and eastern parts. The forest coverage of the district is estimated as 240.8 ha, and the district contains three isolated natural forest

patches: Horagolla National Park, Maimbulkanda sanctuary, and Yakadawala forest reserve [10].

**2.2. Ethnobotanical Field Survey and Data Collection.** Ethnobotanical information in the study area about the use of plant species for the treatment of inflammatory conditions was documented from all thirteen divisional secretariat areas, that is, Attanagalla, Mirigama, Minuwangoda, Gampaha, Mahara, Dompe, Ja-Ela, Divulapitiya, Katana, Biyagama, Negombo, Wattala, and Kelaniya. This survey was carried out from December 2014 to December 2016, and the data were collected through semistructured and open-ended interviews using a pretested questionnaire. The questionnaire was pretested by administering to a selected group of the population with a similar sociocultural background in different administrative districts of Sri Lanka. The random sampling method was used to recruit 458 volunteers from the general population of the district who were aged above 30 years. The participants were selected randomly from a list of households in each divisional secretariat area, and visits were made to each of those households for data collection. Written informed consent was obtained prior to the study. The number of informants for a species mentioning its uses was assessed and categorized. The questionnaire used to compile ethnobotanical information comprised the local name, source, part(s) used, method of traditional preparation, and demographic information of the informants such as age, gender, experience, and educational background.

The ethical approval was obtained from the Ethical Review Committee, Faculty of Medicine, University of Ruhuna, Sri Lanka (permit issued on 15/09/2014). Data were analyzed using SPSS Statistics package version 20.

**2.3. Plant Specimen Collection and Preservation.** Plant species used for the treatment of inflammatory conditions were collected, dried, preserved, and mounted on herbarium sheets. Botanical names and families were verified using the book series titled “Flora of Sri Lanka” by one of the authors (MTN), who is a botanist. The botanical names have also been checked with the data available at <http://www.theplantlist.org>. The specimens were deposited at the Herbarium in the Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka.

**2.4. Quantitative Analysis of the Ethnobotanical Information.** The knowledge of medicinal plant usage was quantitatively assessed using the relative frequency of citation (RFC), family importance value (FIV), and use value (UV). The RFC and FIV were calculated to quantitatively determine the consensus between informants on the use of medicinal plants in the region as it gives the local importance of a species or a family. The RFC was calculated using the standard method of Vitalini et al. [11] and Savikin et al. [12]:

$$\text{RFC} = \frac{\text{FC}}{N} \quad (0 < \text{RFC} < 1). \quad (1)$$

TABLE 1: Statistics on the usage of herbal therapeutics as anti-inflammatory remedies.

| Parameter  | Percentage (%) |
|--|----------------|
| 1. Demographic data of regular users             |                |
| 1.1. Gender                                      |                |
| Male   | 39.28          |
| Female   | 60.72          |
| 1.2. Age group (years)                           |                |
| 30–45  | 39.17          |
| 46–60  | 44.17          |
| 61–75  | 8.33           |
| >75  | 8.33           |
| 1.3. Educational background                      |                |
| University degree/diploma and above              | 12.18          |
| Up to university entrance exam*                  | 37.39          |
| Ordinary-level education and below**             | 46.95          |
| No schooling                                     | 3.48           |
| 2. Source of information/knowledge               |                |
| From ancestors/family members                    | 60.42          |
| Neighbours/friends                               | 13.89          |
| Doctors/traditional physicians                   | 7.64           |
| Media  | 13.19          |
| Own experience                                   | 4.86           |
| 3. Reason for usage                              |                |
| Safe/less side effects                           | 46.16          |
| Previous success                                 | 35.67          |
| Easy access to the plant materials               | 6.29           |
| High cost of other treatment methods             | 3.49           |
| Nonavailability of modern health care facilities | 0              |
| Failure of other treatment methods               | 8.39           |

\*The highest educational qualification which can be obtained at school (13 years of school education); \*\* 1–11 years of school education.

The value of RFC for species and families of medicinal plants is based on the citing percentage of informants for that particular species and plant family. FC is the number of informants who mentioned the species, while  $N$  is the total number of informants participating in the study.

The family importance value (FIV) was calculated by taking the percentage of informants mentioning the family:

$$FIV = \frac{FC(\text{family})}{N} \times 100, \quad (2)$$

where FC is the number of informants mentioning the family, while  $N$  is the total number of informants participating in the study.

The use value demonstrates the relative importance of plant species known locally and was determined by the following formula [13, 14]:

$$UV_i = \sum \frac{U_i}{N_i}, \quad (3)$$

where  $U_i$  is the number of use reports described by each informer for species  $i$ , while  $N_i$  is the total number of informers describing the specific species  $i$ .

### 3. Results

Out of the total participants, 232 (50.7%) claimed the use of medicinal plants for the treatment of inflammatory

TABLE 2: Family importance value (FIV).

| Family         | FIV   |
|----------------|-------|
| Acanthaceae    | 11.35 |
| Amaryllidaceae | 0.22  |
| Apiaceae       | 23.58 |
| Asclepiadaceae | 0.22  |
| Asphodelaceae  | 0.44  |
| Bignoniaceae   | 0.87  |
| Clusiaceae     | 0.44  |
| Combretaceae   | 0.44  |
| Crassulaceae   | 0.22  |
| Cyperaceae     | 0.44  |
| Euphorbiaceae  | 1.31  |
| Fabaceae       | 3.49  |
| Lamiaceae      | 0.44  |
| Lauraceae      | 0.65  |
| Loganiaceae    | 0.44  |
| Malvaceae      | 0.87  |
| Meliaceae      | 0.44  |
| Menispermaceae | 13.53 |
| Molluginaceae  | 0.22  |
| Moringaceae    | 0.87  |
| Piperaceae     | 1.31  |
| Poaceae        | 0.44  |
| Rutaceae       | 13.32 |
| Sapindaceae    | 0.22  |
| Sapotaceae     | 0.87  |
| Solanaceae     | 10.92 |
| Verbenaceae    | 3.49  |
| Zingiberaceae  | 12.23 |

conditions such as fever, cough, asthma, joint pain, and swellings. 46.16% have mentioned the reason for their choice as their belief in the safety and low adverse effects associated with the herbal formulations. The majority of the users (65.91%) claimed that they use these herbal preparations at the initial stage of a disease before using any other medications, while 18.94% have mentioned the simultaneous usage of other medications. A considerable proportion (12.12%) claimed that the herbal therapeutics will be used as a last resort, when other treatment methods have failed. These people diagnose the inflammatory conditions by their signs and symptoms rather than specific laboratory tests. The knowledge of the herbal remedies had transferred through generations, while the media have also contributed in promoting the usage of herbal therapeutics (Table 1).

A total of 43 medicinal plants belonging to 28 plant families were mentioned, out of which *Coriandrum sativum* (RFC = 0.23) was the most cited species, followed by *Coscinium fenestratum* (RFC = 0.13) and *Adhatoda vasica* (RFC = 0.12). The most cited plant family was Fabaceae, and the family importance value was highest in Apiaceae (23.58%) (Table 2). The most dominant life form of the species reported includes herbs (39.5%) (Figure 2). The most frequently used plant part was leaves (33.3%) (Figure 3), followed by twigs/stems/barks/bulbs/rhizomes (26.7%). Medicinal plants used in folk herbal remedies were prepared and administered in various forms, and the most common preparation method was infusion (31.4%) (Figure 4). The percentage of oral administration (47%) of

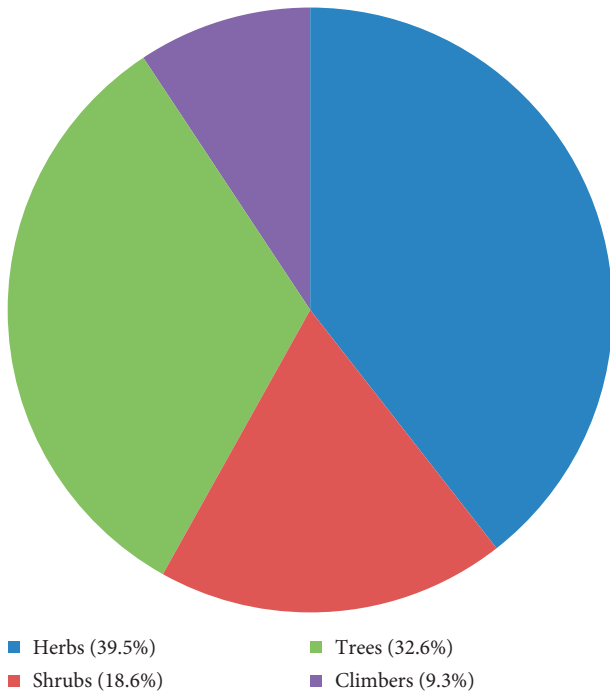


FIGURE 2: Life form of the plants used as anti-inflammatory remedies.

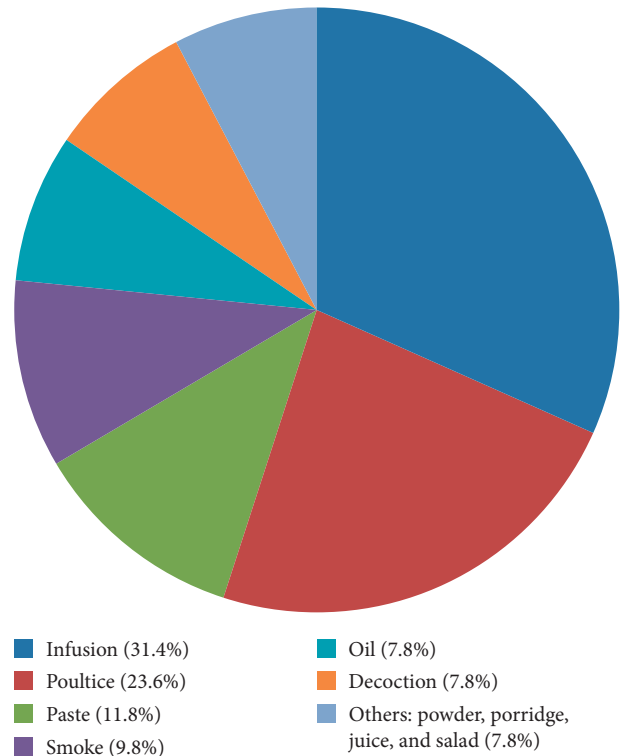


FIGURE 4: Mode of utilization reported to treat inflammatory conditions.

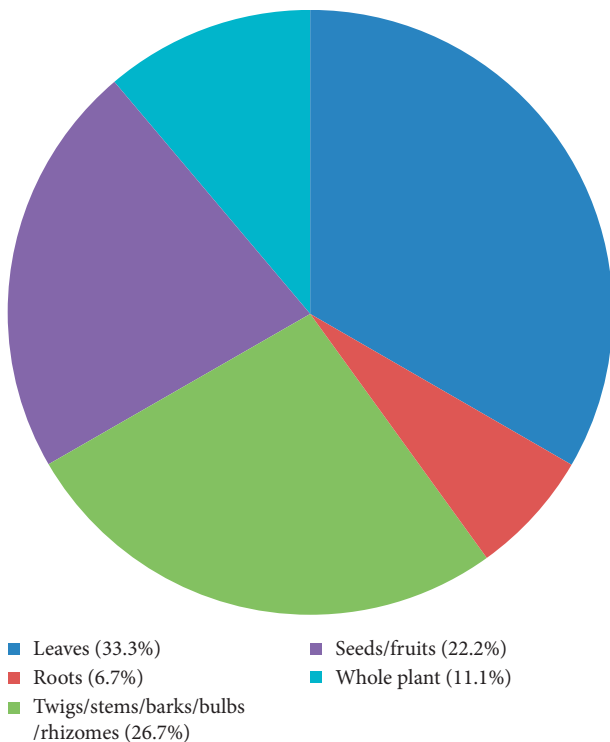


FIGURE 3: Plant parts used in herbal preparations.

herbal preparation was almost higher than that of external or topical application (43.2%) and inhalation (9.8%). Most of the crude drugs were prepared from single plant species; however, combinations of multiple species were also reported, while some preparations were administered along

with honey, sugar, sugar candy, salt, coconut oil, and so on. Although various commercial preparations of herbal origin were mentioned by some of the participants, these were not considered during the data analysis. The summary of the medicinal plant species used in Gampaha District to treat inflammatory conditions is given in Table 3.

Majority of the people belonging to the nonuser category (70.9%) had used some kind of herbal therapeutics at some stage of their lives and mentioned that the usage was discontinued due to the difficulty in preparation (24.69%) and collection of plant materials (22.22%). Other reasons that hindered the usage of herbal preparations have been identified as a relatively long period of time taken for healing and the unpleasant smell and the taste. Some of these people have mentioned that they do not have any faith as the effectiveness of the herbal formulations is not scientifically proven. Interestingly, 71.43% of the nonusers mentioned that they would shift to herbal products if the efficacy of these products could be scientifically validated.

#### 4. Discussion

Sri Lanka has a rich source of medicinal plants distributed in different geographical regions, and a large section of the Sri Lankan population still rely on traditional plant medicines that are abundantly available, economical, and believed to be of little or no side effects. Indigenous knowledge of the remedies has been transferred from one generation to the next through traditional healers, knowledgeable elders, or ordinary people, mostly without any written documents.

TABLE 3: Medicinal plant species used in Gampaha District to treat inflammatory conditions.

| Family         | Scientific name                           | Vernacular name | Life form | Parts used           | Preparation         | Inflammatory conditions treated             | RFC   | UV   | Reported usage in the literature [6]                            | Voucher specimen number |
|----------------|---|-----------------|-----------|----------------------|---------------------|---|-------|------|---|-------------------------|
| Acanthaceae    | <i>Adhatoda vasica</i> Nees               | Adhathoda       | Shrub     | Leaves, twigs, roots | Infusion, poultice  | Swellings in joints, cough, asthma, catarrh | 0.12  | 2.56 | Diarrhea, fever, asthma   | MNWP-01                 |
| Amaryllidaceae | <i>Allium sativum</i> L.                  | Sudulunu        | Herb      | Bulbs                | Infusion            | Asthma                                      | 0.002 | 1.0  | Asthma, gout  | MNWP-02                 |
| Apiaceae       | <i>Coriandrum sativum</i> L.              | Koththamalli    | Herb      | Seeds                | Infusion            | Cold, fever, asthma                         | 0.23  | 2.59 | Inflammation  | MNWP-03                 |
| Asclepiadaceae | <i>Calotropis gigantea</i> (L.) Dryand.   | Wara            | Shrub     | Whole plant          | Poultice            | Sprains, swellings                          | 0.002 | 1.0  | Skin diseases, leprosy, jaundice, sinus troubles                | MNWP-04                 |
| Asphodelaceae  | <i>Aloe vera</i> (L.) Burm.f.             | Komarika        | Herb      | Leaves               | Paste               | Cough, asthma                               | 0.004 | 1.0  | Cough   | MNWP-05                 |
| Bignoniaceae   | <i>Oroxylum indicum</i> (L.) Kurz         | Thotila         | Tree      | Barks                | Poultice            | Swellings in joints                         | 0.009 | 1.0  | Rheumatic swellings, fractures                                  | MNWP-06                 |
| Clusiaceae     | <i>Calophyllum inophyllum</i> L.          | Domba           | Tree      | Seeds                | Oil, poultice       | Swellings in joints                         | 0.004 | 1.0  | Chronic rheumatism, swellings in joints                         | MNWP-07                 |
| Combretaceae   | <i>Terminalia chebula</i> Retz.           | Aralu           | Tree      | Fruits               | Powder              | Fever                                       | 0.004 | 1.0  | Fever, eye diseases, piles, chronic dysentery                   | MNWP-08                 |
| Crassulaceae   | <i>Kalanchoe laciniata</i> (L.) DC.       | Akkapana        | Herb      | Leaves               | Infusion            | Cough, asthma, cold                         | 0.002 | 1.5  | Urinary diseases, diarrhea, dysentery, cough, cold              | MNWP-09                 |
| Cyperaceae     | <i>Cyperus rotundus</i> L.                | Kaladuru        | Herb      | Whole plant          | Infusion            | Fever                                       | 0.004 | 1.0  | Fever, bronchitis   | MNWP-10                 |
| Euphorbiaceae  | <i>Phyllanthus emblica</i> L.             | Nelli           | Tree      | Fruits               | Poultice            | Redness and swellings in the eye            | 0.004 | 1.0  | Inflammation in the eye, gonorrhoea, diarrhea, urinary diseases | MNWP-11                 |
|                | <i>Ricinus communis</i> L.                | Enderu          | Shrub     | Leaves               | Poultice            | Headache, joint pains, swellings            | 0.009 | 1.5  | Headache, boils, rheumatism                                     | MNWP-12                 |
|                | <i>Glycyrrhiza glabra</i> L.              | Welmi           | Herb      | Twigs                | Infusion            | Catarrh, asthma                             | 0.022 | 1.4  | Laryngitis, bronchitis  | MNWP-13                 |
|                | <i>Pterocarpus santalinus</i> L.f.        | Rath-handun     | Tree      | Stems                | Paste               | Headache, pain, swellings in joints         | 0.004 | 1.5  | Rheumatism, insect bites, headache                              | MNWP-14                 |
| Fabaceae       | <i>Tamarindus indica</i> L.               | Siyabala        | Tree      | Leaves               | Paste               | Swellings in joints                         | 0.006 | 1.0  | Boils, rheumatism   | MNWP-15                 |
|                | <i>Desmodium triflorum</i> (L.) DC.       | Undupiyali      | Herb      | Leaves               | Paste               | Swellings in joints                         | 0.004 | 1.0  | Ulcers, dysentery, inflammation                                 | MNWP-16                 |
|                | <i>Trigonella foenum-graecum</i> L.       | Uluhal          | Herb      | Seeds                | Poultice            | Pain in joints                              | 0.002 | 1.0  | Dyspepsia, diarrhea, rheumatism                                 | MNWP-17                 |
| Lamiaceae      | <i>Plectranthus zeylanicus</i> Benth.     | Iriweriya       | Herb      | Roots                | Infusion, decoction | Fever                                       | 0.004 | 1.0  | Fever, cough, asthma  | MNWP-18                 |
|                | <i>Cinnamomum camphora</i> (L.) J.Presl   | Kapuru          | Tree      | Fruits               | Oil                 | Fever, swellings in joints, asthma          | 0.002 | 1.5  | Inflammation, bruises, sprains, whooping cough, asthma          | MNWP-19                 |
| Lauraceae      | <i>Litsea glutinosa</i> (Lour.) C.B. Rob. | Bomi            | Tree      | Barks                | Paste               | Swellings in joints                         | 0.004 | 1.0  | Diarrhea, dysentery, sprains, bruises, rheumatism               | MNWP-20                 |
| Loganiaceae    | <i>Strychnos potatorum</i> L.f.           | Ingini          | Tree      | Seeds                | Paste               | Swellings in joints                         | 0.004 | 1.0  | Eye diseases, diarrhea  | MNWP-21                 |
| Malvaceae      | <i>Sida acuta</i> Burm.f.                 | Babila          | Herb      | Roots                | Infusion, decoction | Fever                                       | 0.009 | 1.0  | Fever, impotency, rheumatism                                    | MNWP-22                 |

TABLE 3: Continued.

| Family         | Scientific name                                       | Vernacular name | Life form     | Parts used    | Preparation         | Inflammatory conditions treated             | RFC   | UV   | Reported usage in the literature [6]                           | Voucher specimen number |
|----------------|---|-----------------|---------------|---------------|---------------------|---|-------|------|--|-------------------------|
| Meliaceae      | <i>Azadirachta indica</i> A.Juss.                     | Kohomba         | Tree          | Leaves        | Poultice            | Pain in joints                              | 0.004 | 1.0  | Catarrh, leprosy and skin diseases, rheumatism, wounds, ulcers | MNWP-23                 |
| Menispermaceae | <i>Coscinium fenestratum</i> (Goetgh.) Colebr.        | Veniwelgata     | Woody climber | Stems         | Infusion            | Fever, cough, asthma                        | 0.13  | 2.43 | Fever, tetanus, dressing wounds, ulcers                        | MNWP-24                 |
|                | <i>Tinospora cordifolia</i> (Willd.) Miers            | Rasakida        | Climber       | Stems         | Infusion            | Fever                                       | 0.009 | 1.0  | Fever, skin diseases, diabetes, dysentery, rheumatism          | MNWP-25                 |
| Molluginaceae  | <i>Mollugo cerviana</i> (L.) Ser.                     | Pathpadagum     | Herb          | Whole plant   | Infusion            | Fever, asthma                               | 0.065 | 1.63 | Fever, skin diseases, gonorrhoea                               | MNWP-26                 |
| Moringaceae    | <i>Moringa oleifera</i> Lam.                          | Murunga         | Shrub         | Barks         | Infusion, poultice  | Asthma, swellings in pain                   | 0.009 | 1.5  | Asthma, gout, rheumatism, remedy for snakebite poisoning       | MNWP-27                 |
| Piperaceae     | <i>Piper longum</i> L.                                | Thippili        | Herb          | Fruit         | Infusion, decoction | Fever, asthma, cough                        | 0.013 | 1.3  | Fever, cough, bronchitis                                       | MNWP-28                 |
| Poaceae        | <i>Eleusine indica</i> (L.) Gaertn.                   | Bela-tana       | Herb          | Whole plant   | Poultice            | Swellings, sprains                          | 0.004 | 1.5  | Sprains and dislocations                                       | MNWP-29                 |
|                | <i>Aegle marmelos</i> (L.) Corrêa                     | Beli            | Tree          | Leaves, roots | Decoction           | Asthma, fever                               | 0.009 | 1.5  | Fever, asthma, dysentery, piles, dyspepsia                     | MNWP-30                 |
| Rutaceae       | <i>Atalantia ceylanica</i> (Arn.) Oliv.               | Yakinarang      | Shrub         | Leaves        | Infusion, smoke     | Cough, cold, breathing difficulties, asthma | 0.01  | 2.36 | Catarrh, bronchitis and other chest complaints, fever          | MNWP-31                 |
|                | <i>Citrus aurantium</i> L.                            | Embul-Dodam     | Tree          | Fruits        | Juice               | Cough, to draw out phlegm                   | 0.026 | 1.25 | Chronic cough  | MNWP-32                 |
| Sapindaceae    | <i>Citrus aurantifolia</i> (Christm.) Swingle         | Dehi            | Tree          | Leaves        | Smoke               | Cough, headache                             | 0.08  | 1.11 | Cough, stomachache, cleaning wounds, dysentery                 | MNWP-33                 |
|                | <i>Cardiospermum halicacabum</i> L.                   | Wel-penela      | Climber       | Whole plant   | Infusion            | Swellings in joints                         | 0.002 | 1.0  | Rheumatism, dropsy, earache, bronchitis                        | MNWP-34                 |
| Sapotaceae     | <i>Madhuca longifolia</i> (J.Koenig ex L.) J.F.Macbr. | Mee             | Tree          | Seeds         | Oil, poultice       | Swellings and pain in joints                | 0.009 | 1.5  | Fractures, rheumatism, snakebites                              | MNWP-35                 |
|                | <i>Solanum xanthocarpum</i> Schrad. & H. Wendl.       | Katuwelbatu     | Herb          | Leaves        | Infusion            | Fever, cough, asthma                        | 0.087 | 2.22 | Cough, asthma, colic fever, toothache                          | MNWP-36                 |
| Solanaceae     | <i>Solanum surattense</i> Burm. f.                    | Ela-batu        | Herb          | Leaves        | Porridge, smoke     | Cough, asthma                               | 0.013 | 1.67 | Rheumatism, cough, diarrhoea                                   | MNWP-37                 |
|                | <i>Solanum trilobatum</i> L.                          | Wel-Thithbatu   | Shrub         | Leaves        | Porridge, salad     | Prolonged cough                             | 0.009 | 1.0  | Cough  | MNWP-38                 |
| Verbenaceae    | <i>Lantana camara</i> L.                              | Gandapana       | Shrub         | Leaves        | Smoke               | Fever, cough, asthma                        | 0.009 | 2.25 | Asthma, fever, cough   | MNWP-39                 |
|                | <i>Vitex negundo</i> L.                               | Nika            | Shrub         | Leaves        | Smoke, paste        | Swellings in joints, cough, asthma, fever   | 0.026 | 1.92 | Rheumatic swellings, headache, catarrh, asthma                 | MNWP-40                 |
| Zingiberaceae  | <i>Alpinia galanga</i> (L.) Willd.                    | Araththa        | Herb          | Rhizome       | Infusion            | Fever                                       | 0.026 | 1.0  | Rheumatism, bronchitis   | MNWP-41                 |
|                | <i>Zingiber officinale</i> Roscoe                     | Inguru          | Herb          | Rhizomes      | Infusion            | Fever, asthma, cough                        | 0.092 | 1.69 | Cold, cough, fever, asthma                                     | MNWP-42                 |
|                | <i>Curcuma zedoaria</i> (Christm.) Roscoe             | Haran-kaha      | Herb          | Rhizomes      | Poultice            | Swellings in joints                         | 0.004 | 1.0  | Sprains, dermatitis, wound healing                             | MNWP-43                 |

However, factors such as cultural change, particularly the influence of modernization, lack of written documents, deforestation, environmental degradation, and lack of interests shown by the younger generations impose a serious threat to the enhancement of existing knowledge and practices of medicinal plants. Thus, ethnobotanical studies and subsequent conservation measures are urgently required to prevent the loss of valuable indigenous knowledge of medicinal plants. Furthermore, the importance of ethnobotanical research has been increasing, since potential sources of drugs could disappear in the future as a result of the rapid loss of biodiversity. This is the first report of an in-depth ethnobotanical study in Sri Lanka, and it enabled us to make some contribution in the preservation of the traditional systems of medicine by proper documentation and identification of specimens.

Owing to the high global prevalence of pathophysiological conditions linked with inflammation, a substantial number of ethnobotanical studies have specifically been focused on assessing the indigenous knowledge of traditional anti-inflammatory remedies. The study conducted in five local government areas in Ogun State of Nigeria has led to the identification of 83 different plant species that have been used in the management of inflammatory diseases [15]. A total of 34 species in 32 genera and 22 families were encountered during the field study conducted to gather ethnobotanical information on traditional medicinal plants exclusively used for the management of inflammation-related ailments by the Khampti community of Arunachal Pradesh, India [16]. Despite the wide utility of medicinal plants for the treatment of inflammatory conditions, surprisingly, no such studies have been conducted in Sri Lanka yet. Furthermore, there is a rich reserve of indigenous knowledge of medicinal plants due to a large number of practitioners of traditional medicine; however, the scientific validation of these traditional claims is still at its infancy.

The study revealed that the medicinal uses of some of the plant species mentioned by the participants have not been documented in the literature, for example, the usage of *Calotropis gigantea* for sprains/swellings and *Strychnos potatorum* for swellings in the joints. The medicinal plants with a higher frequency of citation as determined from the current study would signpost the probable existence of valuable phytochemical compounds, and it requires a search for prospective new drugs to cure many inflammatory disorders. Therefore, the effectiveness and the safety of the identified plants will be assessed by phytochemical and pharmacological investigations in the follow-up studies. Therefore, the present study based on indigenous knowledge of medicinal plants would contribute towards the national development agenda of the country, a subarea of the National Research and Development Framework (NRDF) in Sri Lanka [17].

However, there are certain limitations of the current study, which need to be improved to conduct a more comprehensive island-wide study in the future. For example, when the households were selected randomly from a list, households with strong beliefs on herbal medicine could have been overlooked as well as households who profusely

refuse such remedies. Furthermore, only the people who can speak English or Sinhala have been recruited to this study; therefore, it may not represent the whole population of the country. If the above limitations could be overcome, then it would enable the documentation and preservation of indigenous knowledge of herbal medicine restricted among different segments of the Sri Lankan population.

## 5. Conclusion

This study reports the first ethnobotanical survey in Sri Lanka. Among 43 medicinal plants belonging to 28 reported plant families, Fabaceae was the most cited plant family. The most popular medicinal plants among the inhabitants in Gampaha District include *Coriandrum sativum*, *Coscinium fenestratum*, and *Adhatoda vasica*. The investigations revealed that the indigenous herbal medicines are still common among the local communities, and even the nonusers are ready to shift to herbal products if systematic scientific information is available. Therefore, the present study signifies the necessity of the scientific validation of herbal remedies.

## Abbreviations

RFC: Relative frequency of citation  
FIV: Family importance value  
UV: Use value.

## Ethical Approval

The ethical approval was obtained from the Ethical Review Committee, Faculty of Medicine, University of Ruhuna, Sri Lanka.

## Consent

Written informed consent was obtained prior to the study.

## Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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