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RESEARCH ARTICLE

A SURVEY ON THE THERAPEUTIC USE OF MEDICINAL PLANTS IN MONTSERRADO COUNTY, LIBERIA.

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ABSTRACT

Background: Carried out in Liberia's Montserrado County, this ethnopharmacological survey was designed to record information about common therapeutic plants. Many of the herbal medications of the study area are still unpublished, and their usage is either poorly or entirely unrecorded, despite the high rate of their usage in the country. Such a study is of high importance in Liberia, where the effectiveness of a decent number of herbal medicines has been proved but yet to be documented. **Objectives:** The study sought to chronicle the many methods of herbal preparations and healing practices used in the study area, as well as to identify plants (and their various parts) that are often used by herbal medicine practitioners in Liberia's Montserrado County. **Materials and Methods:** The study utilized a cross-sectional descriptive design and conducted a face-to-face interview for 32 willing THMPs (Traditional Herbal Medicine Practitioners) in the county. The survey documented the socio-demographic information of the respondents, their mostly utilized plants (and the parts used), mode of use, common and local names and details of the mode of preparation of herbal medicines. **Results and conclusion**: Information about the botanical components and formulas of their medicines, the sources of raw materials, and the kinds of illnesses that the plants are used to cure was supplied by the government-recognized herbalists in the study area. According to the respondents, a total of ninety-two (92) medicinal plant species from thirty-one (31) families are commonly utilized to prepare herbal medications for the treatment of fifteen (15) various medical ailments. The leaves were the most frequently used plant parts, and the Fabaceae family was the most frequently mentioned. Malaria, goa, typhoid, dysentery, the common cold, piles, and infertility were the illnesses that required the most treatment. The documented common medicinal plants used in traditional medicine preparation in the study area are indications of opportunities for pharmaceutical resources in the country which is known for high biodiversity. Further research on the identified plants and more is hoped to foster novel medicinal discoveries which will be of national or global impact in the future.

KEYWORDS

Medicinal plants; Herbal remedies; Ethnopharmacology; Montserrado county; Liberia

1. INTRODUCTION

Liberia's growing population of around 5.2 million tends to make people susceptible to infections and ailments because of traffic in numerous places. Additionally, ethnopharmacological surveys are required in Africa to determine which medicinal plants healers utilize to cure a variety of human illnesses. Such surveys would serve as essential foundations for phamacognostic discoveries which solve medical challenges. In Africa, Cameroon, Ghana, Nigeria, Egypt, Madagascar, Morocco, Algeria, and Ethiopia included the majority of ethnopharmacological studies and published data on the anticancer potential of plants (Segun et al., 2018).The study humans have utilized plants and plant-derived products since ancient times, and their significance in daily living and global health is a major concern (Ozioma and Chinwe, 2019). With 70% to 80% of the population using traditional medicine in poor nations, medicinal plants are thought to be a possible source of treatments or curative assistance (Sandberg et al., 2001). Before the introduction of Western medicine, "Traditional Medical Practitioner" (TMP) and other professionals employed plants and plant extracts as remedies (Schulz et al., 2010). Herbs with qualities similar to those of conventional medications but in a crude form are known as medicinal herbs (Oladeji, 2016). A traditional healer or medical practitioner is a person who uses herbs, minerals, animal parts, and other practices based on their people's cultures and beliefs to treat patients in their community. They are regarded as trustworthy, capable, adaptable, and experienced. The Organization of African Unity (OAU), which is now the African Union (AU), established the Scientific Technical and Research Commission (STRC) and decided that the term "Traditional Medical Practitioner" (TMP) is a contemporary, appropriate designation (Ozioma and Chinwe, 2019).

Original plant remedies, written records, and preserved monuments all attest to the fact that using medicinal plants for healing is as old as humanity itself. Centuries of fighting diseases have raised awareness of the use of medicinal plants, which has resulted in the discovery of medications in plant parts like bark, seeds, fruit bodies, and more. current science has recognized the significance of these botanicals and included them into contemporary pharmacology (Petrovska, 2012). The most popular medical system in the world is traditional herbal medicine, which is practiced in all cultures and societies (WHO, 2013). Herbs, plant materials, herbal preparations, and completed herbal products that comprise whole

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plants, plant parts, or other plant materials for therapeutic purposes or other advantages are all included in this category.

Approximately 80% of the population in Africa depends on medicinal plants to meet their fundamental health needs (WHO, 2013). Traditional herbal therapy is used extensively; practitioners work with students, Ebola survivors, pregnant women, breastfeeding moms, primary health programs, reproductive health, infertility, and hypertensive patients (WHO, 2001). Traditional herbal therapy is frequently used for a variety of reasons, such as accessibility, affordability, efficacy, lack of access to modern medicine, and cultural and religious preferences (James et al., 2019). That study the Act creates two committees to advise the board on issues pertaining to the standardization and classification of traditional medicines as well as the professional conduct of practitioners of traditional medicine (Peter et al., 2018).

Identification of wild plants gathered by residents of Maden County, Turkey, for medicinal purposes was the goal of one study. Over the course of two years (2008–2010), 131 specimens of vascular plants were gathered, and the plants' preparation techniques, local plant names, used portions, and demographic traits were examined. The main ethnic group implicated were the Zazas, one of the largest in the area. 88 medicinal plants from 41 families were found in the investigation; four of these plants were employed for the first time as a cure. Asteraceae (>13%), Fabaceae (>8%), Brassicaceae (>7%), Poaceae (>4%), Rosaceae and Lamiaceae (>17% of use-reports), and Urticaceae (>21%) were the most often encountered groups of medicinal plants. Decoction and infusion were the most widely used preparations. Residents of the study region have long used herbal remedies, and the majority of ethnobotanical uses were confirmed by comparing data from plants grown in Maden with experimental data from earlier laboratory investigations. A review of the literature revealed that medicinal plants from Maden are used to treat the same or related illnesses all over the world.

There seem to exist a very little information on the local applications of plants in Liberia, and scientific evidence of their medical properties has been patchy. The few instances are a little out of date. Apart from this, there are no records of such nature in the study area yet. A physician stationed in the country's interior recorded the ethnomedical applications of more than 200 medicinal plants among the Mano of Nimba County in the early 1800s, marking the beginning of documenting of this knowledge. The native names and usage of more than 250 significant plant species in seven groups were documented, some forty years after similar documenting of plant use among the Mano tribe by (Marshall and Hawthorne, 2013). An anthropological study of the Kpelle tribe's medical customs and belief systems was carried out in the Salala District of central Liberia. The study occasionally mentioned the regional names of plants and their traditional therapeutic applications. Pharmaceutical medications are typically based on chemicals that are present in medicinal plants. These plants are classified as "wild plants" because they grow on their own in natural or semi-natural environments. Because the majority of contemporary medications are derived from plants, pharmaceutical companies have developed an interest in traditional medicine (Fokunang et al., 2011). The documenting of essential local information on the biological resources and raw materials available to the pharmaceutical industry depends on research into indigenous knowledge of ethnopharmacological processes and products. In order to chronicle the many methods of herbal preparations and healing practices used in the study area, this study aimed to identify plants (and their various parts) that are often used by herbal medicine practitioners in Montserrado County, Liberia.

2. METHODOLOGY

2.1 Study Area

The study was carried out in Montserrado County, located in the northwest of Liberia, a country in West Africa (Fig. 1). The coordinates of the county are 30' N 10 34' W (LISGIS, 2022).

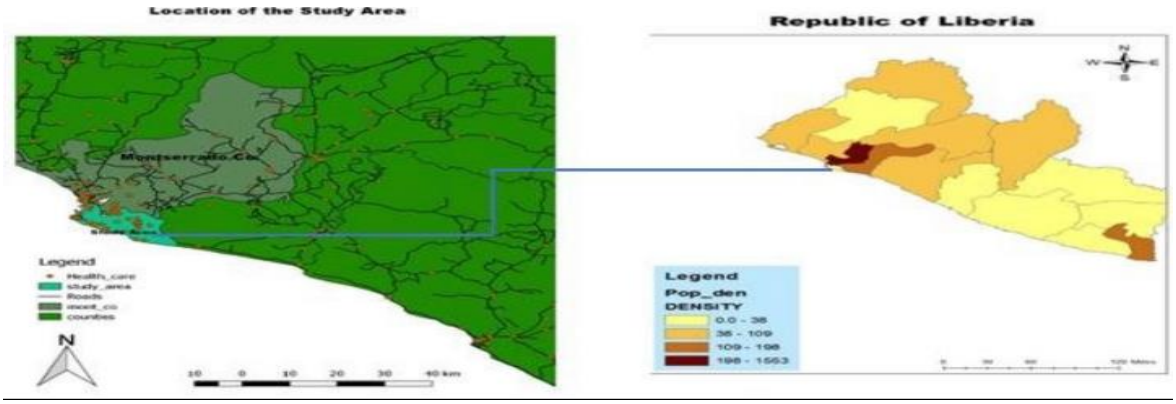

Figure 1: The study area

It is Liberia's oldest of the country's fifteen political divisions. Liberia's capital, Monrovia, is located in Bensonville, which is also its capital. Montserrado County is bordered to the north by Bong County, to the east and west by Bomi and Margibi Counties, and to the south by the Atlantic Ocean (Republic of Liberia, 2008). About 36.7% of Liberia's total population, or 1,920,965 people, live in Montserrado County (Liberia Institute of Statistics and Geo-Information Services, 2022).

2.2 Research Design

The research design method used in the study was a mix of explorative and descriptive designs.

2.3 Population\Sample of the study

The study took into account the 32 THMPs who were registered with the Ministry of Health and Social Welfare's Complementary Medicines Unit in the Republic of Liberia. This process was carried out in accordance with (Ahmed, 2024). Which indicated that at 99%confidence level, the whole population should be sampled (100%) if a study's population is smaller than 50.

2.4 Data Collection and Analysis

To gather information about medicinal plants in the study area, semi-structured interviews and field observations were engaged with the THMPs in a face-to-face format. Plant samples were gathered in the field, and photographs were taken to help with identification. Information on the medicinal plants, including their local names, parts used, preparation and preservation techniques, and diseases treated, were recorded on the spot using a data recorder. Excel 2016 was used to analyze the collected data and determine the percentages of all numerical data. All collated and analyzed data are presented in Tables and Figures.

3. RESULT

Table 1: Respondents' Socio-demographic Information

Characteristics	Categories	Frequency	%
Gender	Male	20	63
	Female	12	37
	Total	**32**	**100**
Age Range of Respondents	18-30	2	6

Table 1 (cont): Respondents' Socio-demographic Information			
	31-45	10	31
	46-55	8	25
	56 and above	12	38
	Total	**32**	**100**
Marital Status of Respondents	Single	8	25
	Married	22	69
	Widower/Widow	2	6
	Total	**32**	**100**
Respondents Nationality	Liberian	27	84
	Others	5	16
	Total	**32**	**100**
Respondents Career	Full-Time HMP	26	81
	Part- Time HMP	6	19
	Total	**32**	**100**
Duration of the business	Less than 2 years	1	3
	2-5 years	7	22
	6-10	8	25
	Above 10 years	16	50
	Total	**32**	**100**
Level of Education	Never been to School	25	78
	Primary school drop out	6	19
	BSc	1	3
	Total	**32**	**100**

Table 1 shows that of the 32 THMPs that were recorded during the study, 20 (63%) were men and 12 (37%) were women. Six responses were under 30, ten were over thirty but under forty-four, eight were over forty-four but under fifty-five, and twelve were above fifty-five. Among those surveyed, the majority had never attended school. Twenty-five respondents (78%) had never attended school, six (19%) had dropped out of high school, and one respondent (3%) had a bachelor's degree. About half of them have over ten years of experience in the field. Few respondents had innate talents, while the majority (30%) entered their professions through training, inheritance, or both.

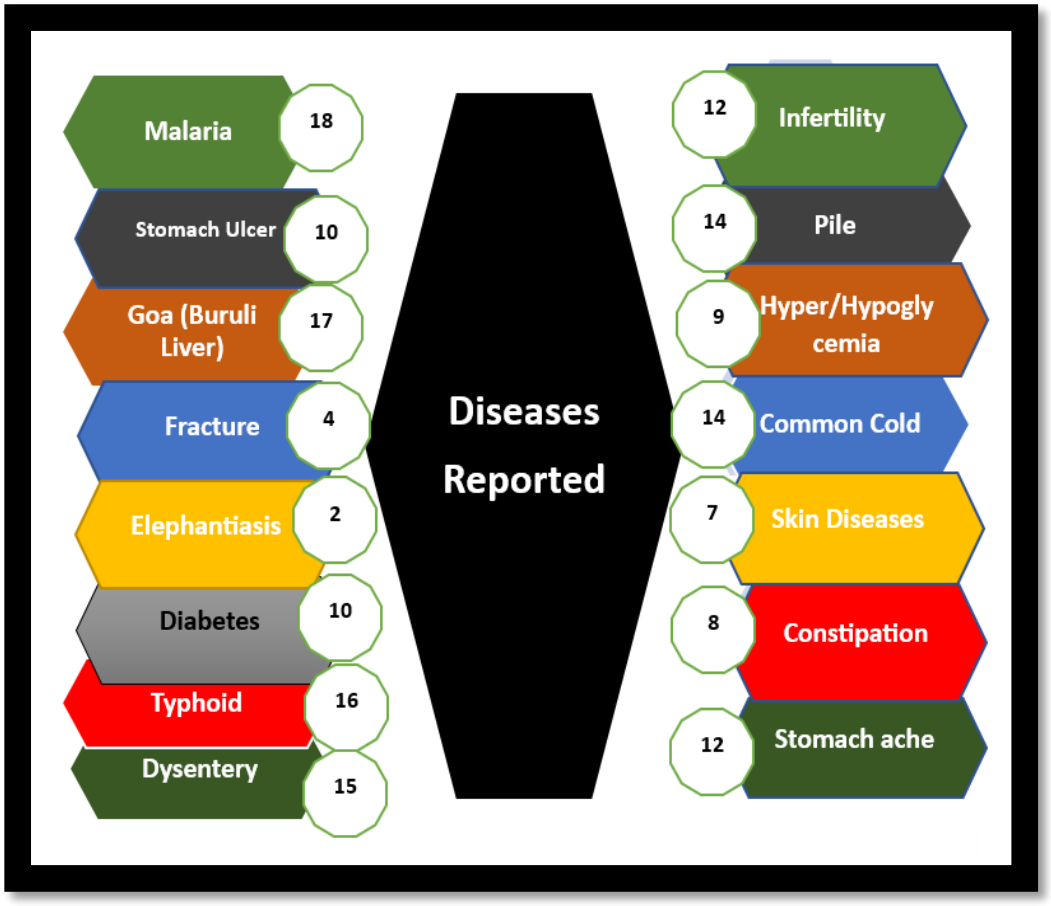

Figure 2: List of diseases treated and number of Traditional Healers who reported them

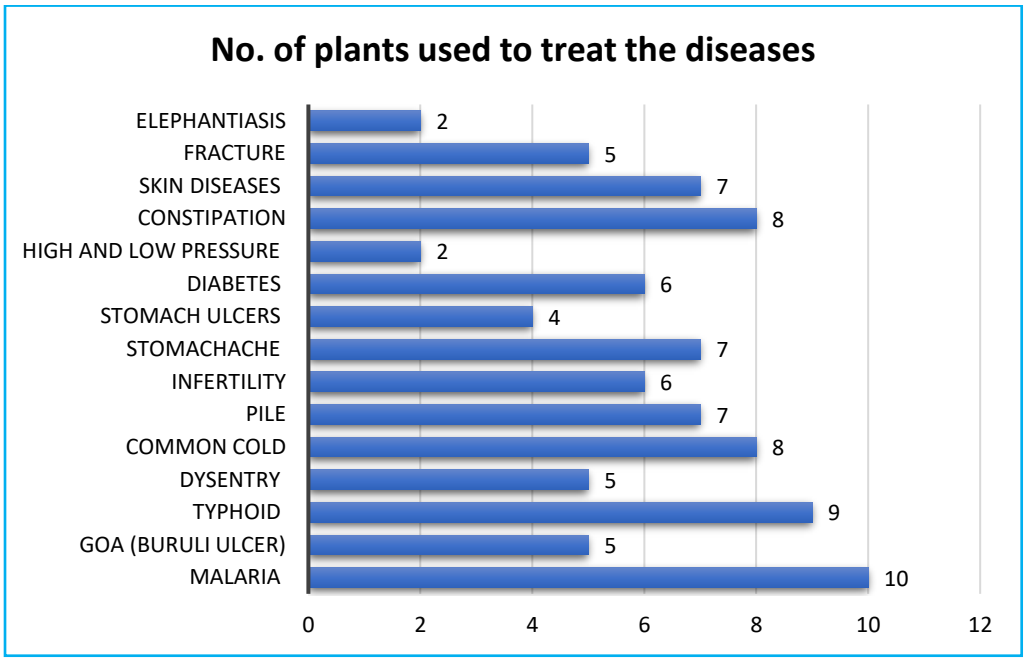

Figure 3: Number of plants used in the treatment of various diseases

Figures 2 and 3 reveals that 18 out of 32 THMPs (56%) were effective in treating malaria. Of these, about half (50%) having typhoid treatment, and roughly 53 percent said they could pose a concern to Goa. According to some, they can treat diabetes (31%), infertility (37%), dysentery (43%), the common cold (46%), and piles (43%). It is common for THMPs to use multiple herbal remedies for the same illness.

Table 2: Names of plants and plants parts used in the treatment of Malaria.

No.	Plants species	Family names	Local names\ Common names	Plants Parts used	Preparation and administration method
1.	*Alstonia boonei*	*Apocynaceae*	Pattern wood	Bark	Decoction of either stem is drunk, root is drunk.
2.	*Cassia siberiana*	*Fabaceae*	Drumstick tree	Leaves	Soaked in water for days and drunk. Boiled and drunk.
3.	*Citrus hystrix*	*Rutaceae*	Fuhtorlorla (G)	Leaves	Boiled and decoction is drunk
4.	*Hyoseris radiata*	*Asteraceae*	Bonbonlah (K)	Leaves	Boiled and decoction is taken
5.	*Magnifera indica*	*Anarcardiaceae*	Toulelor (K)	Leaves	Boiled and content macerated and is drunk
6.	*Musa sapientum*	*Musaceae*	Banana	Leaves	Young leaves are boiled, and decoction is taken.
7.	*Mitragyna stipulosa*	*Rubiceae*	Mboi (M)	Bark	Bark of the stem is soaked in water for days and drunk
8.	*Lantana camara*	*Verbarnaceae*	Weed wild sage	Bark	Decoction is combined with the leaves of cympbopogon cictratus is drunk
9.	*Dialium guineense*	*Fabaceae*	Black velvet	Leaves	Grounded with lime, squeezed and juice is drunk.
10.	*Mangifera indica*	*Anacardiaceae*	Mango Plum	Leaves and Bark	Powered fruits mixed with clay and applied as lotion

Local Names Legend**:** Ki: Kissi, K: Kpelle, G: Gbandi, Ma: Mandingo, Me: Mende

Table 3: Names of plants and plants parts used in the treatment of Goa (Buruli Ulcer)

No.	Plants species	Family names	Local names\ Common names	Plants Parts used	Preparation and administration method
1.	*Pseudobombax septenatum*	*Malvaceae*	Covide (G)	Bark	Boiled and decoction is drunk
2.	*Genus'shelichrysum*	*Asteraceae*	C-Gbolor (G)	Leaves	Peeled and boiled, decoction is drunk
3.	*Schefflera digitata*	*Araliaceae*	Kpakuen (G)	Bark	Boiled and decoction is drunk
4.	*Mangifera indica*	*Anacardiaceae*	Plum-Glang (G)	Fruit	Powered fruits mixed with clay and applied as lotion
5.	*Pultenaea daphnoides*	*Fabaceae*	Dorborlaylang (G)	Leaves	Mixed and boiled and decoction is drunk

Local Names Legend**:** Ki: Kissi, K: Kpelle, G: Gbandi, Ma: Mandingo, Me: Mende

Table 4: Names of plants and plants parts used in the treatment of Typhoid.

No.	Plants species	Family names	Local names\Common names	Plants Parts used	Preparation and administration method
1.	Clerodendrum unbellatum	Lamiaceae	Wulo (Me)	Leaves	Decoction is drunk.
2.	Fiscus exasperata	Moraceae	Sandpaper Leave	Root	Root decoction is drunk.
3.	Parinari excelsa	Chrysobalanaceae	Rough Skin Plum	Root	Macerated and drunk, fruits infused and drunk.
4.	Portulaca olracea	Portulaceae	Common Purslane	Leaves	Decoction of leaves is taken with spice.
5.	Meganeuron spp	Meliaceae	Sanga (Me)	Leaves, Root and Bark	Decoction is drunk
6.	Euphorbia leucocephala	Euphorbiaceae	Yumuyaba (G)	Leaves	Grounded boiled and decoction is drunk
7.	Prunus tomentosa	Rosaceae	Danglan (G)	Leaves	Decoction is mixed and boiled and is drunk
8.	Hyoseris radiata	Asteraceae	Bonbonlah (K)	Leaves	Boiled and decoction is taken
9.	Magnifera indica	Asteraceae	Toulelor (K)	Leaves	Boiled and content macerated and is drunk

Local Names Legend**:** Ki: Kissi, K: Kpelle, G: Gbandi, Ma: Mandingo, Me: Mende

Table 5: Names of plants and plants parts used in the treatment Dysentry

No.	Plants species	Family names	Local names\ Common names	Plants Parts used	Preparation and administration method
1.	*Cnestis ferruginea*	*Connaraceae*	Nyamawa (Me)	Stem	Settled in water for sometime and is drunk.
2.	*Harungana madagascariensis*	*Hypericaceae*	Dragon blood\ pink stick	Leave	Young leave together with *solanum melagena*
3.	*Microdesmis keanyana*	*Pandaceae*	Niklif (Ma)\ Bush Flaggy	Leave	Cooked with *solanum melagena* and juice is drunk, decoction is drunk.
4.	*Phyllanthus muellerianus*	*Euphorbiaceae*	Furuka (Ma)	Leave	Infusion of young shoot is drunk.
5.	*Newbouldia laevis*	*Bignoniaceae*	Kundinakara (Ma)\ Tree of Life	Leave	Roasted with beni-seed, pounded in a mortar and powered is eaten

Local Names Legend**:** Ki: Kissi, K: Kpelle, G: Gbandi, Ma: Mandingo, Me: Mende

Tables 2-5 are sample tables showing a list of some plant species, their family names, common names, plant part used and method of preparation for malaria, goa, typhoid and dysentery. From these tables, it was discovered that plants of the fabaceae family are mostly used for disease treatment, levaes are the commonest plant part used and decoction is the mostly used method of administration.

4. Discussion

This study has examined the ethnomedical significance of common medicinal plants in Liberia's Montserrado County. In order to supply the necessary information and properly analyze the data for academic results, herbal medicine practitioners were involved in the study. More research of this type is anticipated soon as it is still relatively new in the area. Results indicate that 92 plant species from 31 families can treat 15 different ailments. These plants can be utilized alone or in conjunction with other plants. Certain preparations were mixed with spices, clay, sugar, and honey. The largest family of plants was Fabaceae, which was followed by Euphorbiaceae and Bignoniaceae. Asteraceae and Lamiaceae represented three and four species, respectively, while Annonaceae and Rutaceae each supplied five. Prior research on the ethnomedicinal profile of plants in Pakistan's southern Punjab produced similar findings by (Usman et al., 2021). The five species of the Asteraceae and Solanaceae families were next in line, with the Poaceae family being the largest. The groups Brassicaceae and Fabaceae each had four species, whilst the Lamiaceae and Moraceae each had three. The Amaranthaceae, Amaryllidaceae, Apiaceae, Chenopodiaceae, Convolvulaceae, Meliaceae, and Myrtaceae were among the two-species families of plants that were frequently used.

This study documented each of the following families contributed one species, six families supplied two species each, five families contributed three species apiece. Additionally, the results indicate that when THMPs are making remedies, leaves are the primary ingredient they employ most often, followed by roots. According to previous research done all around the world by a number of writers, plant's leaves were most commonly used to treat a wide range of illnesses (Macfoy, 2013; Kadir et al., 2013; Adepoju et al., 2023, 2024). One possible explanation for this could be because levaes are easier to gather and have been shown to contain more bioactive components than other plant parts (Bibi et al., 2014; Yaseen et al., 2015; Zahoor et al., 2017).

Given how frequently leaves are utilized medicinally in the research area, there is minimal chance that medicinal plants, especially trees and shrubs, will be harmed. This is consistent with report (Chen et al., 2016). Nevertheless, there are serious hazards to the dominant plants that are exploited or their families, which rely on the mother plant and may develop roots, remove bark, and produce leafy-stem harvests. But because it stops some vegetative development from moving into reproductive stages like flowering and fruit/seed set, harvesting leaves also puts medicinal plants at risk of declining because it stops plants from naturally or in the wild from regenerating (Schippman et al., 2002; Kala et al., 2006).

The majority of medicinal plant parts are used either by themselves, in combination with other plants, or in combination with other parts of the same or different species, according to the informants. Additional ingredients such as sugar, wine, honey, brine, and other adjuvants may be used for a number of purposes to increase the product's healing potential, improve its flavor, or decrease adverse effects (Lin-Lin et al., 2018). For instance, honey has demonstrated potential in the management and treatment of various ailments, such as diabetes, cancer, wound healing, viral infections, and cardiovascular disorders. Herb-infused honey is also utilized in the traditional medicinal system to prevent chronic toxic diseases, cure wounds, diabetes, and lymphedema (Kumar et al., 2023).

The preference of traditional healers for herbal anti-malarial treatments

confirms the disease's prevalence in the study area. This survey indicated that 10% of medicinal plants are produced, whereas 90% are found in the wild. Our study is in line with similar percentages of medicinal plant species reported from different regions (Macfoy, 2013; Chen et al., 2016). A higher proportion of medicinal plants originating from wild sources suggested a greater species diversity in the study area. Although 16 trees were used as herbal remedies, generalizations cannot be made because it is impossible to pinpoint the precise quantity of plants that the THMPs in Montserrado County, Liberia extract annually.

5. Conclusion

Montserrado County, Liberia, has a rich source of medicinal plants and a portion of the population still rely on traditional plant medicines which is abundant and a large stable, economical, and believed to be effective. 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 documentation. However, based on the results, it can be concluded that factors such as cultural change, particularly the influence of modernization, lack of written documents, deforestation, environmental degradation, resulting in the paucity of raw materials, impose a serious threat to the enhancement of existing knowledge and practices of medicinal plants. The importance of ethnopharmacological research has been increasing, since potential sources of drugs could disappear in the future because of the biodiversity's quick decline. This research focused on the field that, through appropriate identification, recording, and harmonization of medical information, can help preserve traditional medical systems. Finally, ethnopharmacological studies and subsequent conservation measures are urgently required to prevent the loss of valuable indigenous knowledge of medicinal plants.

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