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FROM NUISANCE TO NECESSITY: DOCUMENTING THE ETHNOMEDICINAL IMPORTANCE OF WEEDS IN ONDO STATE NIGERIA

Azeez, A. A.[*1,2], Azeez, A. T.[3] and Ayeyemi, B. M.[4]

[1]Rainforest Research Station, Forestry Research Institute of Nigeria, Ibadan.
[2]Department of Forest Sciences, University of Helsinki, P.O Box 27, 00014, Helsinki Finland.
[3]Department of Animal Nutrition and Biotechnology, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria.
[4]Department of Computational Data Science and Engineering, North Carolina Agricultural and Technical State University, 1601 East Market Street, Greensboro, North Carolina 27411, USA.
[*]Corresponding Author's Email: triplehails4real@gmail.com Tel: +2348054751686.
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ABSTRACT

The search for natural medicinal sources has gained momentum due to the adverse side effects associated with conventional medicine. Traditionally, forests and protected areas have been the primary focus for local practitioners of herbal medicine, leading to significant and often unmeasured impacts on forest ecosystems, particularly on tree species that are vital for local medicinal preparations. This study identified and documented 56 medicinal weeds belonging to 49 genera and 25 families commonly utilized in the Odigbo Local Government Area of Ondo State for the treatment of approximately 75 ailments. Among these, family Asteraceae is the most widely used plant family with diverse functions employed in treating fevers, infections (skin, blood, lung, kidney), digestive disorders (diarrhea, dysentery, liver diseases), inflammatory conditions (sores, burns, arthritis, rheumatism), and cardiovascular ailments. The Amaranthaceae family is frequently employed to address kidney diseases, gonorrhoea, and inflammatory conditions; Fabaceae is recognized for its effectiveness against diarrhea, and Euphorbiaceae is noted for remedies for stomach issues. Whole plants (59.6%) are the most utilized parts in herbal formulations, followed by leaves (19.3%) and leaves and stem (7.0%). Despite their economic potential and role as viable alternatives to tree species in local medicine, the perceived nuisance of these weeds has often led to an undervaluation of their medicinal properties. The insights provided in this study aim to raise awareness regarding the medicinal significance of these weeds and to serve as a foundational resource for researchers interested in exploring their phytochemical and ethnomedicinal properties.

Keywords: Weeds, Ethnomedicine, Asteraceae, Poaceae, Euphorbiaceae.

INTRODUCTION

The global demand for herbal medicines has seen a remarkable increase in recent years, driven by a growing recognition of their inherent advantages, including widespread availability, minimal side effects, and cost-effectiveness (Srivastava, 2000; Radha and Manokari, 2017). This burgeoning interest in natural remedies has propelled researchers and practitioners to explore the rich biodiversity of weeds as valuable sources of medicinal flora. Weeds, often overlooked in favour of more traditionally recognized medicinal plants, possess a unique potential to address persistent health challenges faced by both humans and livestock. As the search for sustainable and effective treatment options intensifies, it becomes increasingly important to harness the therapeutic properties of these plants.

Plants are the ultimate source of natural products, comprising an extensive array of medicinal compounds that have been utilized in various cultures for centuries (Immanuel and Elizabeth, 2009). Traditional medicine systems, particularly those rooted in ancient practices such as Ayurveda and Siddha, thrive in globally recognized hotspots like India and China, where they constitute nearly 90% of herbal treatments derived from the whole or parts of plants, including stems, bark, roots, rhizomes, leaves, flowers, fruits, and seeds. In addition to these components, many traditional systems leverage secondary metabolites such as resin, gum, and latex for drug formulation (Radha and Manokari, 2017).

Despite their rich potential, weeds have received limited attention as sources of traditional medicine. This oversight may be attributed to a prevailing preference for tropical primary forests, which are often regarded as the primary source of medicinal plants due to their extraordinary biodiversity and endemism (Macilwain, 1998;

Stepp and Moerman, 2001). Local communities, in their quest for herbal remedies to treat various ailments, frequently turn to these forests, especially when orthodox medical solutions are either prohibitively expensive or inadequate. This reliance on forest resources, while providing immediate relief, poses significant threats to the sustainability of tropical ecosystems, as over-exploitation can lead to a decline in both biodiversity and ecosystem services.

Moreover, the pressures of urbanization, agricultural expansion, and climate change exacerbate the challenges faced by tropical primary forests, further diminishing their productivity in critical areas such as environmental conservation and timber production. These factors highlight the urgent need for a paradigm shift in the perception and utilization of weeds, particularly in the context of herbal medicine.

In response to these challenges, this research aims to document the medicinally important weeds found in the Odigbo Local Government Area of Ondo State, Nigeria. By shedding light on these bio-resources, often growing alongside agroforestry crops or around homesteads and typically considered waste during land maintenance, this study seeks to foster a greater appreciation for their medicinal value. The research not only promotes the conservation of these plants but also encourages their sustainable use as alternatives to over-exploited traditional sources, ultimately contributing to improved health outcomes and the preservation of biodiversity. This initiative is intended to empower local communities to recognize and utilize the wealth of knowledge surrounding these often-overlooked plants, thereby enhancing their role in traditional medicine and promoting ecological sustainability.

MATERIALS AND METHODS

Study Area, Plant Collection, Preparation, and Identification

The research was conducted in 2024 in Odigbo Local Government Area of Ondo State, Nigeria known for its diverse plant species and rich traditional medicinal practices. The area comprises various habitats, including farmlands, forest fringes, and homesteads, providing a unique opportunity to explore the medicinal properties of commonly found weeds. A systematic survey was conducted to identify and collect medicinally important weeds from different locations within the study area. The sampling locations were recorded using a GPS device, with coordinates centered at 6°44'01.5"N 4°53'01.7"E. Additional sites were distributed within a 10 km radius to ensure spatial variability. The collection was carried out during the wet and dry seasons in 2024 to capture seasonal variations in plant availability. Weeds were identified based on local knowledge, botanical characteristics, and existing literature. Each plant specimen was labelled with details such as the common name, scientific name, collection date, location, and habitat type. Collected specimens were pressed and dried using standard herbarium techniques. Identification was confirmed with the aid of taxonomic keys and consultation with local herbalists and botanists. Further verification was carried out with reference to the book *Vernacular Names of Nigerian Plants* by Gbile (1984). Specimens were deposited in herbarium of the Forestry Research Institute of Nigeria.

Data Collection and Analysis

Information on the medicinal uses of each weed was gathered through structured interviews with local herbalists, farmers, and community members. The interviews focused on the preparation methods, dosage, and ailments treated by the identified weeds. Qualitative data were recorded to understand the cultural significance and traditional knowledge associated with these plants. Data were analysed to determine the frequency of use, common ailments treated, and the preparation methods associated with each weed. Descriptive statistics were employed to summarize the findings, and a ranking of the most frequently cited weeds was conducted.

Ethical Considerations and Study Limitations

Before the study, ethical approval was obtained from relevant authorities, and informed consent was secured from all participants involved in the interviews. The study adhered to guidelines for conducting research concerning local communities and traditional knowledge. The study acknowledges potential limitations, including the reliance on self-reported data from

interview participants, which may introduce bias. Additionally, the geographical scope was limited to the Odigbo Local Government Area, which may affect the generalizability of the findings to other regions. This methodology aims to provide a comprehensive overview of the medicinally important weeds in the study area, contributing valuable insights to the field of ethnobotany and traditional medicine.

RESULTS AND DISCUSSION

The present study documented a total of 56 medicinal weeds, systematically listed alphabetically according to their generic names (Table 1). These plants were classified into 49 distinct genera and 25 botanical families, showcasing a rich diversity of species utilized for traditional medicinal purposes in the study area. Among the families surveyed, the most frequently encountered were Asteraceae represented by eight species, followed by Amaranthaceae and Fabaceae, each represented by six species. The Euphorbiaceae family comprised five species, while both the Poaceae and Rubiaceae families were each represented by three species. The remaining 19 families accounted for 1-2 species each (Fig. 1). This distribution highlights the prominence of certain families in traditional medicine, suggesting a potential focus on specific phylogenetic lineages that are particularly valued for their therapeutic properties (Stepp and Moerman, 2001).

Table 1: Inventory of medicinal weeds frequently utilized in Odigbo Local Government Area, Ondo State.

S/N	Scientific Name	Family	English Name	Yoruba Name
1	*Ageratum conyzoides*	Asteraceae	Whiteweed / Goat weed	Apasa, Imiesu
2	*Alstonia boonei*	Apocynaceae	Cheese wood / Stool wood	Ahun
3	*Alternanthera repens*	Amaranthaceae	Joy weeds / Joseph's coat	Dagunro
4	*Alternanthera sessilis*	Amaranthaceae	Joy weeds	Reku-reku
5	*Amaranthus spinosus*	Amaranthaceae	Pig weed	Tete elegun
6	*Amaranthus viridis*	Amaranthaceae	Slender / Green Amaranth	Tete abalaye
7	*Axonopus compressus*	Poaceae	Carpet grass	Idi
8	*Biophytum petersianum*	Oxalidaceae	Sensitive plant	Patanmo
9	*Boerhavia diffusa*	Nyctaginaceae	Hog weed	Etinpon ola
10	*Bryophyllum pinnatum*	Crassulaceae	Air plant / Miracle leaf	Abamoda
11	*Calotropis procera*	Apocynaceae	Sodom apple	Bomu bomu
12	*Cassia mimosoides*	Fabaceae	Feather-leafed cassia	Kilefimise
13	*Cassia occidentalis*	Fabaceae	Coffee senna	Rere abo
14	*Cassia tora*	Fabaceae	Sickle wild sensitive plant	Ako rere
15	*Celosia taxa*	Amaranthaceae	Wool flower	Aje fowo
16	*Chromolaena odorata*	Asteraceae	Siam weed	Akintola
17	*Cissampelos mucronata*	Menispermaceae	Laghun patha	Jokooje / Jenjoko
18	*Cleome gynandra*	Capparidaceae	African Spider flower	Ekuya
19	*Cleome viscosa*	Capparidaceae	Asian spider flower	Ekuya
20	*Croton zambesicus*	Euphorbiaceae	Lavender croton	Ajeobale
21	*Croton penduliflorus*	Euphorbiaceae	----------	Aworoso
22	*Culcasia scandens*	Araceae	----------	Agunmona
23	*Cyathula prostrata*	Amaranthaceae	----------	Sawere pepe
24	*Cymbopogon giganteus*	Poaceae	Lemon grass	Kooko oba
25	*Desmodium gangeticum*	Fabaceae	Tick-trefoil/ Tick clover	Aberodefe
26	*Euphorbia hirta*	Euphorbiaceae	Asthma weed	Egele / Akun esan
27	*Flocospa africana*	Commelinaceae	----------	Godogbo
28	*Heinsia crinita*	Rubiaceae	Bush apple	Tono poso
29	*Heliotropium indicum*	Boraginaceae	Indian heliotrope	Agogo igun / Ogbe akuko
30	*Hibiscus surattensis*	Malvaceae	Wild sour / Bush sorrel	Sinkinmini
31	*Imperata cylindrica*	Poaceae	Cogon grass / Blady grass	Ekan
32	*Jatropha curcas*	Euphorbiaceae	Barbados nut	Lapalapa / Botuje

S/N	Scientific Name	Family	English Name	Yoruba Name
33	*Jatropha gossypiifolia*	Euphorbiaceae	Bellyache bush	Lapalapa pupa
34	*Kalanchoe crenata*	Crassulaceae	----------	Odundun
35	*Lagera alata*	Asteraceae	Winged lagera	Eru taba
36	*Lagera pterodonta*	Asteraceae	----------	Onrungo
37	*Launaea taraxacifolia*	Asteraceae	Wild lettuce	Yanrin
38	*Mitracarpus scaber*	Rubiaceae	English button grass	Irawo ile
39	*Mollugo nudicaulis*	Molluginaceae	Daisy-leafed chick weed	Chick weed
40	*Momordica charantia*	Curcurbitaceae	Bitter melon	Ejinrin wewe
41	*Morinda lucida*	Rubiaceae	English brimstone tree	Oruwo
42	*Mucuna flagellipes*	Fabaceae	----------	Ijokun
43	*Ocimum basilicum*	Lamiaceae	Sweet basil	Efinrin wewe
44	*Peperomia pellucida*	Piperaceae	Shining bush	Rinrin
45	*Phyllanthus niruri*	Phyllanthaceae	Gale of the wind / Stone breaker	Eyin olobe
46	*Physalis angulata*	Solanaceae	Cut leaf ground cherry	Koropo
47	*Piliostigma reticulatum*	Fabaceae	Camel's foot	Abafe
48	*Pistia stratiotes*	Araceae	Water lettuce / Water cabbage	Oju oro
49	*Scleria depressa*	Cyperaceae	Sword grass	Labe labe
50	*Securidaca longepedunculata*	Polygalaceae	Violet tree	Ipeta
51	*Senecio abyssinicus*	Asteraceae	Ragwort	Amunimuye
52	*Sida acuta*	Malvaceae	Wire weed	Osepotu
53	*Sphenocentrum jollyanum*	Menispermaceae	----------	Akerejupon
54	*Spilanthes filicaulis*	Asteraceae	African power cress	Awerepepe
55	*Talinum triangulare*	Talinaceae	Water leaf	Gbure
56	*Vernonia amygdalina*	Asteraceae	Bitter leaf	Ewuro

Table 2: Overview of medicinal weeds and their utilized parts for treating ailments in Odigbo L.G.A, Ondo State, Nigeria.

S/N	Scientific Name	Parts utilized	Cure Ailments
1	*Ageratum conyzoides*	Leaves, stem and flower	Inflammation, skin infections and kidney diseases
2	*Alstonia boonei*	Leaves and Bark	Fevers
3	*Alternanthera repens*	Leaves and Stem	Gastro-intestinal infections
4	*Alternanthera sessilis*	Whole plant	Asthma, lung infections, liver diseases and haemorrhage
5	*Amaranthus spinosus*	Whole plant	Jaundice and kidney diseases
6	*Amaranthus viridis*	Whole plant	Kidney diseases, stomach troubles, inflammation, boils and gonorrhoea
7	*Axonopus compressus*	Whole plant	Fevers, asthma and breast swelling

S/N	Scientific Name	Parts utilized	Cure Ailments
8	*Biophytum petersianum*	Whole plant	Kidney diseases, stomach troubles, epilepsy and bites
9	*Boerhavia diffusa*	Whole plant	Analgesic, asthma, jaundice, insomnia, kidney diseases and haemorrhoids
10	*Bryophyllum pinnatum*	Leaves	Kidney diseases, hypertension, fevers and cancer
11	*Calotropis procera*	Leaves	Diarrhoea, stomach troubles, ulcers, toothache, joint pains, cramps and elephantiasis
12	*Cassia mimosoides*	Whole plant	Diarrhoea, dysentery and facial eruptions
13	*Cassia occidentalis*	Leaves and Stem	Kidney diseases, rheumatism, leprosy, fevers, eczema, diabetes and worm infestation
14	*Cassia tora*	Leaves and Stem	Skin diseases, stomach troubles, leprosy, itching, snake bite, arthritis and swelling
15	*Celosia taxa*	Whole plant	Fevers, diarrhoea, mouth sores, itching, wounds, jaundice, gonorrhoea and inflammations
16	*Chromolaena odorata*	Whole plant	Fevers and wound
17	*Cissampelos mucronata*	Leaves, Stem and Rhizome	Asthma, cough, fevers, arthritis, obesity, dysentery, snake bite and jaundice
18	*Cleome gynandra*	Whole plant	Fevers, rheumatism and scorpion stings
19	*Cleome viscosa*	Leaves and Seed	Wounds and ulcers
20	*Croton zambesicus*	Leaves	Febrifuge, kidney infections, rheumatism and stomach troubles
21	*Croton penduliflorus*	Whole plant	Stomach troubles, contraceptive and fibroid
22	*Culcasia scandens*	Whole plant	Headaches, fevers and vomiting
23	*Cyathula prostrata*	Whole plant	Coughs and dysentery
24	*Cymbopogon giganteus*	Leaves	Fevers, coughs and kidney diseases

S/N	Scientific Name	Parts utilized	Cure Ailments
25	*Desmodium gangeticum*	Whole plant	Inflammation and diabetes
26	*Euphorbia hirta*	Whole plant	Eye infections, asthma, sore throats, cough, lung infections and veneral diseases
27	*Flocospa africana*	Whole plant	Erectile dysfunction
28	*Heinsia crinita*	Whole plant	Febrile illness and erectile dysfunction
29	*Heliotropium indicum*	Whole plant	Wounds, furuncles, eye infections and ulcers
30	*Hibiscus surattensis*	Whole plant	Stomach troubles, heart problems, skin infections, cancer, convulsion and epilepsy
31	*Imperata cylindrica*	Whole plant	Skin diseases and facial eruptions
32	*Jatropha curcas*	Leaves, Seed and Root	Skin diseases, gonorrhoea, dysentery and diarrhoea
33	*Jatropha gossypi*		
34	*Kalanchoe crenata*	Whole plant	Ear infections, headache, inflammations and convulsion
35	*Lagera alata*	Whole plant	Body pains, rheumatism, arthritis and heart problems
36	*Lagera pterodonta*	Whole plant	Lung infections
37	*Launaea taraxacifolia*	Whole plant	Heart problems, lung infections, blood infections and kidney diseases
38	*Mitracarpus scaber*	Whole plant	Headaches, tooth aches, menstrual disorder, dyspepsia, liver, skin and veneral diseases
39	*Mollugo nudicaulis*	Leaves	Lung infections, vemifuges and liver diseases
40	*Momordica charantia*	Leaves	Stomach troubles, fevers and diabetes
41	*Morinda lucida*	Leaves, Root and Root bark	Fevers and trypanosomiasis
42	*Mucuna flagellipes*	Whole plant	Body pains, diarrhoea, vemifuges and menstrual disorder
43	*Ocimum basilicum*	Whole plant	Inflammation

S/N	Scientific Name	Parts utilized	Cure Ailments
44	*Peperomia pellucida*	Whole plant	Stomach troubles, abscesses, facial eruptions, boils, headaches, fatigue and rheumatism
45	*Phyllanthus niruri*	Whole plant	Liver diseases and ear infections
46	*Physalis angulata*	Whole plant	Body pains, diarrhoea, vemifuges and menstrual disorder
47	*Piliostigma reticulatum*	Leaves	Insomnia, arthritis, diarrhoea, dysentery, eye and ear infections
48	*Pistia stratiotes*	Whole plant	Skin infections, leprosy, ulcers, piles, stomach disorders and inflammations
49	*Scleria depressa*	Whole plant	Menstrual disorders and veneral diseases
50	*Securidaca longepedunculata*	Whole plant	Headaches, arthritis, coughs, fevers, diabetes and stomach troubles
51	*Senecio abyssinicus*	Leaves, Stem and Flower	Sores and burns
52	*Sida acuta*	Whole plant	Kidney infections, blood infections, liver diseases and bites
53	*Sphenocentrum jollyanum*	Leaves, Seed, Bark and Root bark	Stomach disorder, kidney diseases, swellings, epilepsy and convulsion
54	*Spilanthes filicaulis*	Whole plant	Fevers
55	*Talinum triangulare*	Whole plant	Liver diseases, anaemia, cancer and heart diseases
56	*Vernonia amygdalina*	Leaves and Stem	Fevers, diarrhoea, dysentery, liver diseases

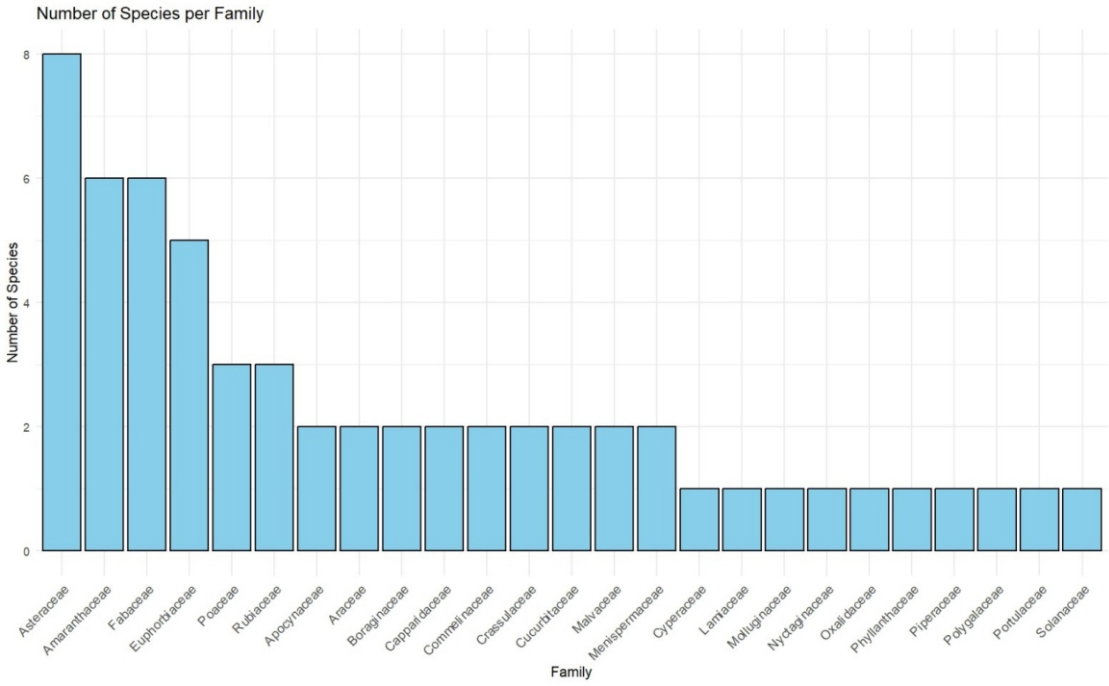

Figure 1: The total count of medicinal weed families identified in the survey.

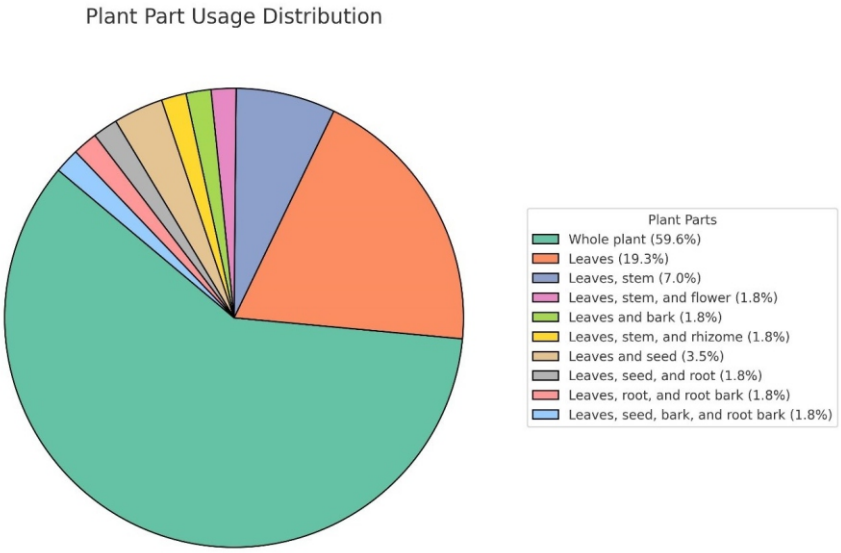

Figure 2: Percentage distribution of various plant parts utilized in treating various ailments.

The survey recorded approximately 75 distinct ailments treated with these medicinals (Table 2). A thorough analysis of the most frequently reported conditions revealed a diverse range of health issues addressed by traditional healers. The ailments include fevers, stomach troubles, diarrhoea, dysentery, coughs, headaches, asthma, ear infections, liver diseases, kidney diseases, rheumatism, arthritis, inflammations, ulcers, and diabetes. This broad spectrum indicates the integral role of these plants in addressing various health concerns, reflecting the traditional knowledge surrounding the use of these species in local communities (Radha and Manokari, 2017).

The family Amaranthaceae was particularly noteworthy for its medicinal applications, with the highest number of species being used to treat kidney diseases, gonorrhoea, and inflammations. This suggests that the phytochemical properties of Amaranthaceae species may be well-suited for addressing these specific health issues. For

instance, plants such as *Amaranthus spinosus* and *Amaranthus viridis* are known for their anti-inflammatory and diuretic effects, which could be beneficial for kidney health and inflammatory conditions (Immanuel and Elizabeth, 2009).

In the Poaceae family, the highest number of species was associated with treating fevers and coughs, underscoring the importance of grasses in traditional medicine. Plants such as *Cymbopogon giganteus* and *Axonopus compressus* are commonly used for their antipyretic properties, which may contribute to their frequent application in managing febrile conditions (Srivastava, 2000). This points to a valuable understanding of the therapeutic potential of grasses in alleviating common ailments.

Similarly, the Euphorbiaceae family was linked to a significant number of remedies for stomach troubles. Species like *Euphorbia hirta* are renowned for their gastroprotective and antidiarrheal effects, indicating a strong reliance on this family for gastrointestinal health (Macilwain, 1998). In contrast, the Fabaceae family stood out for its use in treating diarrhoea, reflecting a traditional reliance on legumes and their diverse phytochemical constituents that may play a role in digestive health.

The analysis of the plant parts utilized in traditional medicine revealed a clear preference for using the whole plant, which was the most frequently cited component in the treatment of various ailments. This approach suggests a holistic view of plant medicine, where the synergistic effects of multiple phytochemicals found in different parts of the plant may enhance therapeutic efficacy (Stepp and Moerman, 2001). Following the whole plant, the leaves were the next most used part, followed by stems, roots, bark, seeds, root bark, flowers, and rhizomes (Fig. 2). This hierarchy of plant parts used in traditional remedies reflects a deep understanding of the various phytochemical profiles and therapeutic potentials associated with each plant part.

The predominance of whole plant usage could be indicative of traditional practices that prioritize the use of entire organisms to maximize medicinal benefits. This holistic approach is consistent with ethnobotanical principles that emphasize the interconnectedness of plant structures and their combined effects on health. Furthermore, the frequent use of leaves suggests that they may contain a high concentration of bioactive compounds, such as flavonoids and terpenoids, which are often associated with anti-inflammatory and antioxidant properties (Immanuel and Elizabeth, 2009).

The findings from this survey emphasize the rich diversity of medicinal weeds utilized in traditional practices, reflecting both cultural knowledge and the significance of these plants in managing various health conditions. The data reveal not only the prevalence of certain families and species but also highlight specific health ailments commonly treated with these plants. This study contributes valuable insights into the ethnopharmacological potential of these medicinal weeds, warranting further investigation into their bioactive compounds and therapeutic applications.

CONCLUSION

This study underscores the critical role of medicinal weeds in traditional healthcare practices and highlights the rich diversity of plant species that are accessible for therapeutic use in the region. The identification of 56 medicinal weeds, belonging to 49 genera and 25 families, demonstrates not only the potential for these plants to treat a variety of ailments but also the need to shift perceptions of weeds from mere agricultural nuisances to valuable resources for health and wellness. As many of these plants are commonly found in homesteads, farms, and urban areas, there exists a unique opportunity to integrate their use into everyday health practices. This can reduce the reliance on overharvesting more vulnerable medicinal species from forests and reserves, thereby promoting ecological balance and the preservation of vital tree species. Raising awareness about the medicinal properties of these weeds can facilitate community engagement in sustainable practices that benefit both health and the environment. Additionally, this knowledge can inspire further scientific exploration in the fields of ethnobotany, pharmacognosy, and phytochemistry, leading to the discovery of novel bioactive compounds with significant therapeutic potential. By recognizing

and harnessing the medicinal value of these weeds, we can foster a more sustainable relationship with our natural resources while enhancing health outcomes for communities. This study not only contributes to the understanding of local flora but also paves the way for future research aimed at unlocking the full potential of Nigeria's botanical wealth in combating various health challenges.

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CONFLICTS OF INTEREST
The authors declare no conflict of interests.

AUTHORS' CONTRIBUTIONS
AAA- Conceptualization, Data curation, Formal analysis, Software, Visualization, Writing – Original draft, review and editing. ATA- Experiment Design, Data collection, Writing – review and editing. BMA- Formal analysis, Software, Visualization and Investigation.

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