**Indigenous Knowledge of Traditional Practitioners and Ethnobotanical Description of Underutilized Medicinal Plants Used in Treating Some Viral Infections in Southwestern Nigeria**

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ABSTRACT

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| **Aims:** The research aims to document underutilized medicinal plants used in treating viral infections in Southwestern Nigeria and to explore the traditional knowledge associated with their use.**Study Design:** A descriptive cross-sectional study was conducted across six southwestern states of Nigeria. From each state, three rural communities were selected from two Local Government Areas based on the prevalence of herbal healing practices, prominence of practitioners, and their indigenous knowledge of underutilized medicinal plants for treating infectious viral diseases. A total of 48 informants were randomly selected from the study locations.**Place and Duration of Study:** Osun, Oyo, Ondo, Ekiti, Ogun, and Lagos states, Nigeria; between October, 2024 and March, 2025.**Methodology:** Ethnobotanical details regarding medicinal plants were gathered from informants in the six states through structured interviews, observations, group discussions, and field excursions. The identification of rarely utilized medicinal plants was carried out by analyzing their life forms, growth habits, and environments, with support from the traditional healers involved. The Fidelity Level (FL), Informant Consensus Factor (ICF) were determined following established procedures. The pattern of distribution of medicinal plants was examined through a participatory approach**Results:** Over 50% of the respondents knew about the viral diseases and underused medicinal plants for their treatment. A total of 54 medicinal plant species from 32 different families were recorded and detailed. Most of the plant species were herbaceous, perennial, and regarded as either abundant or rare. The fidelity level (FL) values for each underutilized medicinal plant found ranged between 25 and 100%. The Informant Consensus Factor (ICF) value for viral diseases exceeded one (1).**Conclusion:** The indigenous herbal knowledge has highlighted the underutilized medicinal plants for viral disease treatment which can promote sustainable livelihoods in indigenous communities. |

*Keywords:* *Epidemic, Ethnobotany, Medicinal Plants, Knowledge, Underutilized, Viral Diseases*

1. INTRODUCTION

Viral Diseases are recognized as the most prevalent illnesses among the significant recent occurrences of outbreaks and epidemics of new diseases globally (Kojom and Singh, 2021). Viral Diseases have persistently influenced the worldwide population, resulting in elevated levels of illness and death, as evidenced by the COVID-19 pandemic (NCDC, 2019, 2020; Okoye et al., 2021; Kojom & Singh, 2021, and Abubakar et al., 2022). These diseases are recognized for their lethality, capacity to easily disturb cellular functions, and significant effects on human health. Viral illnesses continue to be the leading cause of mortality worldwide in humans (Howard and Fletcher, 2012; and Babar et al., 2013), posing significant challenges to human survival. These illnesses can be readily transmitted and spread in enclosed spaces like homes, schools, workplaces, transportation systems, via contaminated objects such as utensils, towels, or doorknobs, through fresh bodily fluids or vomit, and via contact with an infected individual (Louten, 2016; and Leung, 2021). They constitute the most frequent source of infectious diseases obtained via close personal interaction in home and community environments, including daycare centers and schools. People with viral illnesses can release up to 1012 viral particles per milliliter likely via coughing, sneezing, speaking, and excretion of feces (Tang et al., 2015; and Miller, 2018). The illness can also spread through person-to-person contact via hands and infected objects, through inhalation, and contact with contaminated surfaces. Viral infections occur at elevated levels, varying from serious life-threatening conditions to more mild and self-resolving or asymptomatic illnesses. These elevated rates primarily occur in developing and underdeveloped nations, particularly in Africa and Asia (Kmush et al., 2013; and Nii-Trebi, 2017). This may be associated with limited access to affordable healthcare and medications, inadequate vaccination initiatives, and indifference towards vaccinations (NCDC, 2019, 2020). This placed significant economic strain on global systems, further intensifying the ongoing public health crisis associated with diseases such as dengue, influenza, yellow fever, and hepatitis, which led to widespread outbreaks and increased fatalities (Bloomfield et al., 2012; Sharma et al., 2021; and Upadhyay, 2021).

 Intervention studies demonstrate that herbal practitioners possess valuable inherent knowledge regarding significant herbs and their applications. This knowledge, along with maintaining oral records of indigenous medicinal plants and promoting sharing and circulation, represents a long-awaited initiative that can address the challenges of viral disease transmission and greatly influence the management and prevention of infectious agents. Indigenous knowledge focuses on the direct relationships between people and plants utilized for medicinal purposes and other uses (Pan et al., 2014; Bekele & Reddy. 2015; and Jacob et al., 2024). Indigenous knowledge systems, facilitated by herbal practitioners, can lead to the advancement of lesser-known medicinal plants utilized for treating certain microbial infections. The knowledge acquired from them is crucial for preserving indigenous plants, particularly the underutilized varieties, from one generation to the next. A significant portion of the understanding regarding traditional medicinal plants, especially those that are rarely used, is found in rural areas and primarily passed down orally within families, clans, and small groups. These delicate traditional skills may disappear when many elders possessing essential knowledge about the identification and names of specific plants pass away, or when communities move to urban areas or places with different vegetation, or if the local environment undergoes significant changes (Regassa, 2013; and Aziz et al., 2017).

At present, indigenous communities are not only using medicinal plants but have also created a method for managing them. This has been accomplished over numerous generations and through enduring practices, resulting in a cumulative body of knowledge gained from various observations, practices, interactions, and innovations (Chen et al., 2016; and Mbelebele et al., 2024). This knowledge and practice are dynamic since the practitioners strive to broaden their understanding through mutual sharing of restricted information with one another. In the meantime, knowledge regarding the use of these medicinal plants continues to exist and be shared among them, as they depend on these natural resources for their income (Mazid et al., 2012; and Van & Prinsloo, 2018). This led to many of these beneficial plants staying largely underused. This issue has been attributed to contemporary health care, which has historically failed and is unlikely to succeed in delivering sufficient and fair health services, as well as providing clear and comprehensive information about these plant species for public accessibility.

Currently, in Nigeria, particularly in the Southwestern area, many indigenous individuals, especially those in rural communities, have turned to using herbs for treating various infectious diseases. Individuals residing in isolated regions rely significantly on traditional medicine since contemporary healthcare options are either inaccessible or too expensive (Mahonge et al., 2006; Sofowora et al., 2013; Chukwuma et al., 2015; and Attah et al., 2021). This reliance on conventional herbs may also stem from the expensive nature of modern pharmaceuticals, the difficulty in reaching modern healthcare facilities, and the cultural acceptance of these practices. Meanwhile, it is estimated that the overall count of medicinal plants in global trade is roughly 2500 species (Wang et al., 2019). A significant percentage of these plants are sourced from natural habitats, specifically forests (Chen et al., 2016). A significant amount continued to be underused due to traditional practitioners withholding information about these plants. Consequently, ethnobotanical research can be carried out to catalog plants of significant medicinal value in various areas and to comprehend the traditional knowledge linked to them. This may be a necessary step in creating protective measures as viral diseases are rising sharply in urban regions and the unpredictable outbreaks of viral infections. The traditional knowledge, ethnobotanical analysis, and additional utilization of these plants are crucial for addressing conservation challenges and integrating the use of traditional medicinal plants with established effectiveness for drug production. This suggests the necessity for comprehensive research, recording, and detailing of plants with traditional medicinal significance to thoughtfully utilize and preserve the plant resources and their native knowledge in addressing infectious and non-infectious ailments.

2. material and methods

**2.1 Geographical Characteristics of the Study Area**

This research was carried out in six Southwestern States of Nigeria, namely: Ekiti, Ondo, Osun, Oyo, Ogun, and Lagos States. Southwest is a significant region in Nigeria, covering roughly 191,842 km², defined by a forest cover of 842,499 hectares, situated between longitudes 30° and 7°E and latitudes 4° and 9°N (Oni & Odekunle, 2016). Each state possesses its unique geographical coordinates; Ekiti is situated between 7° 43' 8.35'' N and 5° 18' 39.422'' E, Ondo is located between 7° 04' 60.00" N and 4° 49' 59.99" E, Osun falls between 7° 33' 46.427'' N and 4° 31' 11.853'' E, Oyo is found between 8° 9' 26.571'' N and 3° 36' 52.752'' E, Ogun is positioned between 7°00′N 3°35′E and 7.000°N 3.583°E, while Lagos State is situated between 6°31' 27.765'' N and 3° 22' 45.141'' E (Figure 1). The flora of Southwestern states is primarily defined by freshwater swamps and mangrove forests (Faleyimu & Akinyemi, 2010; and Oyebade, 2012). The region is marked by Guinea savannah flora alongside areas of derived savannah, primarily resulting from human actions such as bush burning for farming and hunting (Ogundele, 2007). These States are home to the Yorubas, over 50 million people (NPC, 2013), bordered by the Atlantic Ocean and acts as a key gateway to the interior regions (Balogun, 2011, University of Birmingham, Unpublished Doctoral dissertation). Every state is defined by significant cities and towns, each town consisting of rural communities that include sub-villages and clans, along with limited access to and high costs of modern healthcare. This fuels the need for natural treatments for both human and animal ailments.



**Fig. 1: Map of Southwestern States in Nigeria.**

**2.2 Study Design**

A cross-sectional descriptive study was carried out in the six Southwestern States of Nigeria. Significantly, three rural communities from two Local Government Areas were chosen from each state, considering the prevalence, prominence of herbal healing practitioners, and their indigenous knowledge regarding the utilization of medicinal plants. The simple random sampling method was employed to choose residents who practice herbal medicine. A total of forty-eight informants were recruited by random sampling from the study location. The plant life of the research area was characterized by data collected from informants reflecting their indigenous viewpoints and categorized through visual observation using the ethic classification method of Ethnobotany (Tessema et al., 2024).

**2.3 Data Collection Procedure**

The research group undertook field trips to selected well-known traditional healing homes in each local government within the six states. A systematic questionnaire and an oral interview were conducted with consenting and willing traditional herbal practitioners in the chosen rural communities. Ethical approval was obtained from Health Research Ethics Committee, Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria and given the number - HREC 2766. Verbal consent was acquired from herbalists who were ready to share information about underused medicinal plants for combating viral diseases. The chosen viral diseases were determined by the common viral illnesses that are prevalent in the Southwestern States of Nigeria. The gathered information pertained to the common or vernacular names of the plants, a concise morphological description and distribution of the plants, their general medicinal or ethnobotanical applications, as well as their use in addressing specific infectious viral diseases.

**2.4 Ethnobotanical Survey**

The collection and survey of plants took place over a duration of six (6) months. Data was gathered from October, 2024 to March, 2025. Information on the ethnobotanical use of lesser-known medicinal plants for treating viral infections were collected from knowledgeable elders and various members of the chosen indigenous community. The interviews and discussions centered on the approved questionnaire. This was succeeded by firsthand observation and gathering of herbal plants from the residences of traditional healers as well as from the natural environment. Multiple enquiries were conducted at various times with the same informants to verify the reliability of the information gathered.

**2.5 Plant Identification, Description and Diversity**

The identification of underused medicinal plants was conducted by examining their life forms, growth patterns, and habitats, with assistance from the participating traditional healers, while a record of the existing herbs was compiled. Medicinal Plants collected were deposited at the herbaria of the Departments of Botany and Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Osun State as well the herbarium of the Department of Biosciences and Biotechnology, University of Medical Sciences, Ondo City, Ondo State for correct identification, voucher numbers and storage.

**2.6 Fidelity Level**

The Fidelity Level (FL)—the proportion of informants stating they utilize a particular plant species to treat a particular diseases and the same plant species serving the same primary function was determined for the most commonly noted conditions, as outlined by Ugulu, (2012) and Chaachouay et al. (2022) using the equation below

FL (%) =$ \frac{Np}{N}$ x 100

where *Np* is the number of informants that claim the use of a plant species to treat a particular
disease and *N* is the number of informants that use the plants as a medicine to treat any
given disease.

**2.7 Informant Consensus Factor (ICF)**

The Informant Consensus Factor (ICF) was employed to assess the similarity among the lesser-known medicinal plants used by herbal practitioners for treating various disease categories. The ICF was calculated following the methods previously outlined by Hossain & Rahman (2018) using the equation provided below;

ICF=$\frac{Nur-Nt}{Nur-1}$.

Where Nur is the reported number of taxa used for a disease category, Nt is the total number of taxa used for the disease category.

An ICF value less than 1 or equal to 0 is indicative of the agreement or random choice of the underutilized medicinal plants used to treat a disease category by traditional herbal practitioners.

**2.8 Abundance of the Identified Underutilized Medicinal Plants**

The pattern of distribution of medicinal plants was examined through a participatory approach, revealing various distribution patterns and highlighting different levels of conservation concern based on their abundance, including those that are present and rare in the locations studied.

3. results and discussion

**3.1 Socio-demographic information of informants**

A total of forty-eight herbal practitioners took part in the study, with men representing 62.50% compared to 37.50% of the participants who were women. Among the traditional healers, 52.08% were elderly between 41 and 50 years; 25.00% were in the 31-40 years age range while 12.50% were between 20 and 30 years of age. Furthermore, 29.17% of the respondents possessed formal education while 70.83% had informal education. According to their occupation, 22.92% of the participants were government employees, while 72.92% were conventional practitioners. Most of the participants (47.92%) possessed over 10 years of experience in herbal practice, 20.83% had under 5 years, and 31.25% had experience ranging from 5 to 10 years (Table 1).

# Table 1: Socio-demographic Information of Respondents

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency**  | **Percentage (%)** |
| **Sex** |  |  |
| Male | 30 | 62.50 |
| Female | 18 | 37.50 |
| **Age group (years)**  |  |  |
| 21-30 | 6 | 12.50 |
| 31-40 | 12 | 25.00 |
| 41-50 | 25 | 52.08 |
| ˃50 | 5 | 10.42 |
| Mean age | 46.73±0.37 |  |
| **Educational Status** |  |  |
| Formal | 14 | 29.17 |
| No formal | 34 | 70.83 |
| **Occupation** |  |  |
| Civil Servant | 11 | 22.92 |
| Traditional Practitioners  | 25 | 72.92 |
| Others | 2 | 4.17 |
| **Traditional Experience Practice** |  |  |
| ˂5 years5-10 years>10 years | 101523 | 20.8331.2547.92 |

*\*Total number of informants (n)= 48, ±=standard error of the mean*

**3.2 Indigenous Knowledge of Traditional Practitioners in Southwestern Nigeria about Infectious Viral Diseases**

The primary viral illnesses noted included Rotavirus Infection, Measles, Mumps, Rabies, Yellow Fever, Pneumonia/Asthma, Poliomyelitis, Hepatitis, Lassa Fever, Viral Meningitis, Common Cold, Ebola and Small Pox. These illnesses were noted as the most widespread viral diseases in Nigeria. Based on the findings, 81.25%, of the Traditional Practitioners in Osun, Ondo, Ogun, Ekiti, Oyo, and Lagos State of Southwestern Nigeria were aware of Rotavirus Infection, 87.50% were informed about Mumps, and 62.50% of the respondents knew about Lassa Fever and Viral Meningitis. All the herbal practitioners were knowledgeable about Measles, Rabies, Yellow Fever, Pneumonia/Asthma, Poliomyelitis, Hepatitis, the Common Cold, Ebola and Smallpox (Table 2).

# Table 2: Indigenous Knowledge of Traditional Practitioners in Southwestern Nigeria about Infectious Viral Diseases

|  |  |  |
| --- | --- | --- |
|  | **State by Regions** |  |
| **Viral Diseases** | **Osun (%)** | **Ondo (%)** | **Ogun (%)** | **Oyo (%)** | **Ekiti (%)** | **Lagos (%)** | **Total (%*)*** |
| Rotavirus Infection | 5 | 6 | 5 | 7 | 8 | 8 | 81.25 |
| Measles | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Mumps | 8 | 7 | 6 | 8 | 7 | 6 | 87.50 |
| Rabies | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Yellow Fever | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Pneumonia/Asthma | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Poliomyelitis | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Hepatitis | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Lassa Fever | 3 | 5 | 4 | 5 | 8 | 5 | 62.50 |
| Viral Meningitis | 3 | 5 | 4 | 5 | 8 | 5 | 62.50 |
| Common Cold | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Small Pox | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Ebola | 8 | 8 | 8 | 8 | 8 | 8 | 10.42 |

 \**Number of informants samples from each state (n)= 8*

**3.3 Indigenous Knowledge of Traditional Practitioners in Southwestern Nigeria about Underutilized Medicinal Plants Used in Treating Viral Infections**

About 81.25% of the participants were aware of underutilized plants used in the treatment of Rotavirus Infections; 93.75% recognized underutilized medicinal plants for Measles treatment; 81.25% were aware of such plants for Mumps, 91.67% had knowledge about the plants used in Rabies treatment; all the participants (100%) knew of the plants for Yellow Fever, Pneumonia/Asthma, Common Cold and Small Pox; 70.83% were aware of the plants used in treating Poliomyelitis. Moreover, 75% of respondents from these areas were aware of underutilized medicinal plants for treating Hepatitis; 41.67% knew about those used for Lassa Fever while 68.75% had the information of underutilized plants used for treating Viral Meningitis. Despite the knowledge and awareness of the participants about Ebola virus, few (10.42%) of them knew about the plants used in treating this disease (Table 3).

# Table 3: Indigenous Knowledge of Traditional Practitioners in Southwestern Nigeria about Underutilized Medicinal Plants Used in Treating Viral Infections

|  |  |  |
| --- | --- | --- |
|  | **State by Regions** |  |
| **Viral Diseases** | **Osun (%)** | **Ondo (%)** | **Ogun (%)** | **Oyo (%)** | **Ekiti (%)** | **Lagos (%)** | **Total (%)** |
| Rotavirus Infection | 5 | 8 | 6 | 8 | 8 | 4 | 81.25 |
| Measles | 8 | 8 | 8 | 8 | 8 | 5 | 93.75 |
| Mumps | 4 | 6 | 7 | 7 | 8 | 7 | 81.25 |
| Rabies | 8 | 8 | 7 | 7 | 7 | 7 | 91.67 |
| Yellow Fever | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Pneumonia/Asthma | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Poliomyelitis | 6 | 6 | 7 | 6 | 5 | 4 | 70.83 |
| Hepatitis | 7 | 7 | 5 | 6 | 6 | 5 | 75 |
| Lassa Fever | 3 | 3 | 4 | 3 | 6 | 1 | 41.67 |
| Viral Meningitis | 2 | 4 | 4 | 3 | 5 | 5 | 68.75 |
| Common Cold | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Small Pox | 8 | 8 | 8 | 8 | 8 | 8 | 100 |
| Ebola | 2 | 1 | 0 | 1 | 0 | 1 | 10.42 |

*\*Number of informants samples from each state (n)= 8*

**3.4 Knowledge Preservation and Transmission of Traditional Practitioners about Underutilized Medicinal Plants in Treating Viral Infectious Diseases in Southwestern Nigeria**

The methods through which herbal practitioners in Southwestern Nigeria gathered information regarding underutilized medicinal plants for treating viral infectious diseases revealed that 52.08% of the participants received this knowledge from their parents or grandparents; 10.42% learned it through formal education; 20.83% gained it through informal learning; while 16.67% taught themselves. Most (66.67%) of those surveyed reported that they convey their knowledge of these plants to family members, 10.42% through formal education, while 22.92% noted that they share their understanding of underutilized medicinal plants for treating viral infections with their community. At the same time, 62.50% of the participants expressed that the understanding they possess regarding underused medicinal plants for treating viral infections might be lost, 20.83% stated that their knowledge cannot be lost, and 16.67% of the participants mentioned that they are uncertain whether their knowledge about these plants can be lost or not.

Additionally, when asked how to maintain the knowledge they possess regarding underutilized medicinal plants for treating viral infectious diseases for future generations, 58.83% of the participants suggested documenting these plants and archiving them, 25.00% believed that periodically engaging young people about the knowledge of medicinal plants is important, 6.25% mentioned formal teaching and learning methods while 10.42% suggested informal teaching and learning methods (Table 4).

# Table 4: Knowledge Preservation and Transmission of Traditional Practitioners about Underutilized Medicinal Plants Mentioned in Treating Viral Infectious Diseases in Southwestern Nigeria

|  |  |  |
| --- | --- | --- |
| **Variable** | **Frequency**  | **Percentage (%)** |
| **How do you acquire knowledge about these plants in treating viral diseases** |  |  |
| Passed down from parents/grandparents | 25 | 52.08 |
| Acquired through formal learning | 5 | 10.42 |
| Acquired through informal learning | 10 | 20.83 |
| Self-taught | 8 | 16.67 |
| **How do you share your knowledge about these plants** |  |  |
| Through formal teaching | 5 | 10.42 |
| By passing it down to family members | 32 | 66.67 |
| By sharing with the community | 11 | 22.92 |
| **Do you think knowledge of these plants is being lost** |  |  |
| Yes | 30 | 62.50 |
| No | 10 | 20.83 |
| Not sure | 8 | 16.67 |
| **What do you think can be done to preserved this knowledge about for future generations** |  |  |
| Documentation | 28 | 58.83 |
| Engaging young people about the knowledge of medicinal plants | 12 | 25.00 |
| Formal teaching and learning | 3 | 6.25 |
| Informal teaching and learning | 5 | 10.42 |

\**Total number of informants (n)= 48*

**3.5 Species Description, Abundance and Ethnobotanical Information of Underutilized Medicinal Plants in Treating Viral Infectious Diseases in Southwestern Nigeria.**

The herbal practitioners interviewed identified 54 underutilized medicinal plants which belong to 32 families for treating infectious viral diseases in the Southwestern States of Nigeria. These medicinal plants were characterized according to their life forms, growth patterns and abundance. All the plants are terrestrial plants. The families of underutilized medicinal plants that were most frequently mentioned are Asteraceae, consisting of seven genera and seven species, and Malvaceae, which includes six genera and six species. Apocynaceae contains four genera and four species, Euphorbiaceae contains two genera and four species, Solanaceae contains three genera and three species and Musaceae contains one genus and two species. All the other families consist of one species and one genus each. Many of these plant species, have growth habits of either herbs, shrubs or trees. Their life cycle varies from annual to perennial (Table 5).

The Fidelity Level (FL) values for every underutilized medicinal plant identified varied from 25 to 100% (Figure 2). Plant species including *Nicotiana tabacum, Anacardium occidentale, Vitellaria paradoxa, Plumbago zeylanica, Capsicum frutescens, Terminalia catappa. Mangifera indica, Morinda lucida, Garcinia kola, Aframomum melegueta, Gossypium barbadense, Khaya ivorensis, Rauvolfia vomitoria,* and *Alstonia boonei* possess a fidelity level of 100%. *Jatropha curcas, Bidens pilosa, Calotropis procera, Launaea taraxacifolia, Carica papaya, Lawsonia inermis, Argemone mexicana, Ficus exasperata, Catharanthus roseus, Tridax procumbens, Nicotiana tabacum, Adansonia digitata, Petiveria alliacea*, and *Enantia chlorantha* have fidelity levels exceeding 50%, while other species such as *Musa sapientum, Ficus exasperata, Ziziyphus spina-christi*, and *Justicia cava* have fidelity levels below 50%. The Informant Consensus Factor (ICF) value for all the viral diseases exceeds 1, with the exception of Yellow Fever, Poliomyelitis, Hepatitis, Lassa Fever, and Ebola, which have an ICF of less than 1 (Figure 3).



**Fig. 2: Fidelity Level of Underutilized medicinal plants Used in Treating Viral Infectious Diseases in Southwestern Nigeria**

# Table 5: Species Description and Ethnobotanical Information of Underutilized Medicinal Plants Used in Treating Viral Infectious Diseases in Southwestern Nigeria

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S/No** | **Botanical Name** | **Vernacular Name** | **Family Name** | **Voucher Number** | **Life forms** | **Growth habits** | **Abundance** | **Viral Disease(s) used for** | **Locality found (State)** |
| 1 | *Ocimum basilicum* L. | Efinrin wewe | Lamiaceae | FPI 2546 | P | Herbaceous | Abundant | Rotavirus Infection, Common cold | All the States |
| 2 | *Jatropha gossypiifolia* L. | Lapa-lapa pupa | Euphorbiaceae | FPI 2547 | P | Shrub | Abundant | Rotavirus Infection | All the states |
| 3 | *Xylopia aethiopica*(Dunal) A.Rich. | Eeru | Annonaceae | FPI 2636 | P | Tree | Rare | Rotavirus Infection, Measles | Ondo State |
| 4 | *Momordica balsamina* L. | Ejinrin Aja | Cucurbitaceae | FPI 2548 | A | Climbers | Rare | Rotavirus Infection, Yellow fever | Ondo State |
| 5 | *Vernonia amygdalina* Delile | Ewuro | Asteraceae | FPI 2549 | P | Shrub | Abundant | Rotavirus Infection | All the States |
| 6 | *Chromolaena odorata* (L.) R.M.King & H.Rob. | Akintola | Asteraceae | FPI 2550 | P | Shrub | Abundant | Rotavirus Infection | All the States |
| 7 | *Sida acuta*Burm.f. | Osokotu | Malvaceae | FPI 2551 | P | Shrub | Present | Rotavirus Infection | Ondo, Osun, Ekiti, Oyo |
| 8 | *Jatropha curcas* L. | Lapa-lapa funfun | Euphorbiaceae | FPI 2552 | P | Shrub | Present | Rotavirus Infection | Ondo, Osun, Ekiti, Oyo |
| 9 | *Synedrella nodiflora*(L.) Gaertn. | Apawofa | Asteraceae | FPI 2637 | A | Herb | Abundant | Pneumonia/ Asthma | All the States |
| 10 | *Cnestis ferruginea*Vahl ex DC. | Àkàrà Àjẹ́ | Connaraceae | FPI 2553 | P | Shrub | Abundant | Rotavirus Infection | All the States |
| 11 | *Bidens pilosa* L. | Abere oloko | Asteraceae | FPI 2554 | A | Herbaceous | Rare | Measles | Ondo, Osun |
| 12 | *Saccharum officinarum*L. | Ireke | Poaceae | FPI 2555 | P | Grass | Abundant | Measles | All the States |
| 13 | *Acalypha wilkesiana*Müll.Arg. | *Aworoso*  | Euphorbiaceae | FPI 2556 | P | Shrub | Present | Measles/small pox | Ondo, Osun, Ekiti, Oyo |
| 14 | *Acalypha ciliata*Forssk. | Ewe Elere | Euphorbiaceae | FPI 2557 | A | Herb | Rare | Measles | Ondo |
| 15 | *Calotropis procera*(Aiton) W.T.Aiton | Bomu-Bomu | Apocynaceae | FPI 2558 | P | Shrub | Present | Measles | Ondo, Ekiti, Oyo |
| 16 | *Nicotiana tabacum*L. | Ewe taba | Solanaceae | FPI 2559 | P | Shrub | Rare | Rabies | Ondo, Ekiti |
| 17 | *Launaea taraxacifolia*(Willd.) Amin ex C.Jeffrey | Ewe Yanrin | Asteraceae | FPI 2600 | P | Herbaceous | Rare | Rabies | Ondo, Ekiti |
| 18 | *Musa paradisiaca* L. | Ewe Ogede | Musaceae | FPI 2601 | P | Herbaceous | Abundant | Rabies | All the States |
| 19 | *Abelmoschus esculentus*(L.) Moench | Eso Ila | Malvaceae | FPI 2602 | B | Herbaceous | Abundant | Rabies | All the States |
| 20 | *Cinnamomum verum*J.Presl | Oloorun | Lauraceae | FPI 2603 | P | Tree | Present | Hepatitis A | Osun, Oyo, Ondo |
| 21 | *Zingiber officinale*Roscoe | Jinja | Zingibareceae | FPI 2604 | P | Herbaceous | Present | Hepatitis A, Ebola | Osun, Oyo, Ondo |
| 22 | *Allium cepa*L. | Alubosa | Amaryllidaceae | FPI 2605 | B | Herbaceous | Present | Hepatitis A | Osun, Oyo, Ondo |
| 23 | *Carica papaya* L. | Ibepe | Caricaceae | FPI 2606 | P | Herbaceous | Rare | Hepatitis A, Yellow fever. Common cold | Osun, Oyo |
| 24 | *Lawsonia inermis* L. | Ewe laali | Lythraceae | FPI 2607 | P | Shrub | Present | Yellow fever | Ondo, Ekiti, Osun, Oyo |
| 25 | *Gossypium barbadense*L. | Ewe Owu | Malvaceae | FPI 2608 | A/ P | Herbaceous | Present | Yellow fever | Ondo, Ekiti, Oyo, Ogun |
| 26 | *Khaya ivorensis*A.Chev. | Oganwo | Meliaceae | FPI 2609 | P | Tree | Rare | Yellow fever | Ondo, Osun |
| 27 | *Rauvolfia vomitoria*Wennberg | Ira-igbo/ Asofeyeje | Apocynaceae | FPI 2611 | P | Tree/Shrub | Present | Yellow fever | Ondo, Osun, Ekiti |
| 28 | *Argemone Mexicana* L. | Ewẹ́ Ẹgẹ́lẹ | Papaveraceae | FPI 2610 | A | Herbaceous | Present | Yellow fever | Ondo, Osun, Ekiti, Oyo |
| 29 | *Alstonia boonei*De Wild. | Igi ahun | Apocynaceae | FPI 2612 | P | Tree | Present | Yellow fever | Ondo, Osun |
| 30 | *Enantia chlorantha*Oliv. | Osó pupa/Osopa | Annonaceae | FPI 2613 | P | Tree | Rare | Yellow fever | Osun, Oyo |
| 31 | *Morinda lucida* Benth. | Òrúwo | Rubiaceae | FPI 2614 | P | Shrub | Rare | Yellow fever | Osun, Oyo |
| 32 | *Garcinia kola*Heckel | Orogbo | Clusiaceae | FPI 2615 | P | Tree | Rare | Ebola | Osun, Oyo |
| 33 | *Aframomum melegueta*K.Schum. | Ataare | Zingiberaceae | FPI 2616 | P | Herbaceous | Rare | Ebola | Osun, Oyo |
| 34 | *Mangifera indica* L. | Ewe Mangoro | Anacardiaceae | FPI 2617 | P | Tree | Abundant | Common cold | All the States |
| 35 | *Plumbago zeylanica* L. | Inabiri | [Plumbaginaceae](https://powo.science.kew.org/taxon/urn%3Alsid%3Aipni.org%3Anames%3A30000293-2) | FPI 2638 | P | Herbaceous | Rare | Common cold | Oyo, Ogun |
| 36 | *Terminalia catappa*L. | Igi Furutu | Combretaceae | FPI 2618 | P | Tree | Abundant | Common cold | All the States |
| 37 | *Adansonia digitata* L. | Igi Ose | Malvaceae | FPI 2619 | P | Tree | Rare | Common cold | Osun, Oyo |
| 38 | *Petiveria alliacea* L. | Tàsán igbó | Phytollacaceae | FPI 2620 | P | Herbaceous | Rare | Common cold/ Pneumonia | Osun, Oyo |
| 39 | Hibiscus cannabinus L. | Oja-Ikoko/Ida Orisa | Malvaceae | FPI 2621 | P | Herbaceous | Rare | Pneumonia/ Asthma | Ondo |
| 40 | *Capsicum frutescens*L. | Ata Ijosi | Solanaceae | FPI 2622 | B | Herbaceous | Rare | Pneumonia/ Asthma | Ondo, Osun |
| 41 | *Dracaena liberica*(Gérôme & Labroy) Byng & Christenh. | Ewe apopo | Asparagaceae | FPI 2623 | P | Herbaceous | Rare | Viral meningitis | Ondo, Osun |
| 42 | *Solanum nigrum* L. | Efo Odu | Solanaceae | FPI 2639 | P | Herbaceous | Present | Pneumonia/ Asthma | Ondo, Oyo, Ekiti |
| 43 | *Tridax procumbens* L. | Ko de le yi ri | Asteraceae | FPI 2624 | P | Herbaceous | Abundant | Polio | Ondo, Osun, Oyo, Ekiti, Ogun |
| 44 | Ageratum conyzoides L. | Imi-esu | Asteraceae | FPI 2625 | P | Herbaceous | Present | Polio | Ondo, Oyo, Ekiti, Ogun |
| 45 | *Catharanthus roseus*(L.) G.Don. | *Apabida pupa* | Apocynaceae | FPI 2626 | P | Shrub | Rare | Polio | Ondo |
| 46 | *Anacardium occidentale* L. | Kasu | Ancardiaceae | FPI 2627 | P | Tree | Abundant | Polio | All the State |
| 47 | *Vitellaria paradoxa*C.F.Gaertn. | Aku malapa | Sapotaceae | FPI 2628 | P | Tree | Rare | Lassa fever | Osun, Oyo |
| 48 | *Musa sapientum* L. | Gbọ̀ọ̀rọ̀ Ayaba | Musaceae | FPI 2634 | P | Herbaceous | Rare | Lassa fever | Osun, Oyo |
| 49 | *Ficus exasperate* Vahl | Ewe Ipin | Moraceae | FPI 2635 | P | Shrub | Present | Lassa fever | Ondo, Oyo, Ekiti, Ogun |
| 50 | *Leea guineensis*G.Don | Alugbokita | Leeaceae | FPI 2629 | P | Shrub | Present | Mumps | Ondo, Oyo, Ekiti, Ogun |
| 51 | Abrus precatorius L. | Oju ologbo | Fabaceae | FPI 2630 | P | Herbaceous | Rare | Lassa fever, Yellow fever | Osun, Oyo |
| 52 | *Ziziphus spina-christi*(L.) Desf. | Ade-egun, Ekanna ese adie | [Rhamnaceae](https://powo.science.kew.org/taxon/urn%3Alsid%3Aipni.org%3Anames%3A50033316-1) | FPI 2631 | P | Herbaceous | Present | Small pox | Ondo, Oyo, Ekiti, Ogun |
| 53 | *Lippia multiflora*Moldenke | Efinrin gogoro | Verbenaceae | FPI 2632 | P | Shrubs | Present | Small pox/measles | Ondo, Oyo, Ekiti, Ogun |
| 54 | *Justicia carnea*Lindl. | Asun eje/ Ewe eje | Acanthaceae | FPI 2633 | P | Herbaceous | Rare | Mumps | Ondo, Osun |

***\*Legend*** *-* ***Life Forms****: A= Annual; B= Biennial; P= Perennial*



**Fig. 3: Informant Consensus Factor of Viral Infectious Diseases among Herbal Practitioners in Southwestern Nigeria**

There are more men participants in this research than women. Tugume et al. (2016) and Abiolu (2018) in similar ethnobotanical surveys in Uganda and southwestern Nigeria respectively also discovered that there were more men respondents than women in their research. This is in contrast with the findings of Cheikhyoussef, et al. (2011), who observed that women herbal practitioners were more prevalent than men in an ethnobotanical study carried out in Namibia. From the findings of this research, a notable proportion of the herbal practitioners were above the age of 40, which suggests that the younger generation is limited in herbal practice. A key reason for this is likely rural-urban migration. Most of the participants had over 10 years of experience in herbal practice. Some asserted that they began learning at a much younger age and are fully involved in the activities while some said they became interested after losing their parents who were deeply engaged in the practice. This suggests the efficacy and potency of medicinal plants in the treatment of various illnesses. It also affirms the believe of indigenous people in the plants growing in their environment.

Over 50% of the participants were aware of diseases such as rotavirus infection, measles, mumps, rabies, yellow fever, pneumonia/asthma, poliomyelitis, hepatitis, the common cold, and smallpox. However, only a few, mainly elites, had a solid understanding of Lassa fever and viral meningitis, with others being unaware. This could be attributed to their well-rounded knowledge, acquired through formal training and exposure. This finding supports the research of MacLennan and Pendry (2011), Gross (2018), and McDaid et al. (2024), who noted that elite herbal practitioners possess greater knowledge of various diseases. However, most of the participants possessed extensive knowledge and were well-informed about the medicinal plants utilized in the treatment of the various infectious viral ailments. Older men and women possess greater understanding of numerous lesser-known medicinal plant species located in various regions, including wooded areas, rugged slopes, and distant agricultural fields. Nearly all the participants viewed these plants as underused since their applications for treating these diseases are not well recognized and utilized. The data collected from the participants regarding the application of underused medicinal plants for treating specific viral infections were consistent among the natives, though they differed in dosage and method of use.

The research survey concerning the understanding, preservation, and dissemination of information among traditional practitioners regarding underutilized medicinal plants noted for addressing viral infectious diseases in southwestern Nigeria revealed that the majority of herbal practitioners received this knowledge from their parents or grandparents. Knowledge of medicinal plants, their uses, and the transmission of this knowledge from parents to children stem from cultural and familial traditions that are deeply rooted in African contexts (Reyes-García et al., 2009; Leonti, 2011; and Mawere, 2024). This highlights the urgent need to preserve traditional knowledge and prevent its gradual loss. However, Payyappallimana (2010) asserted that knowledge transmission is often considered inappropriate in certain contexts due to concerns about the validity of the information. Additionally, students, particularly younger ones, struggle to accurately retain all details, especially when learning from older generations.

Chipungahelo (2015) and Rajasekharan et al. (2023) emphasized that sharing knowledge is the most effective way to preserve traditional knowledge related to underutilized medicinal plants. Informal learning, apprenticeships, and self-learning are regarded as the most credible means of acquiring such knowledge, as learners are often genuinely interested rather than compelled by family or societal norms. Data from young participants whose parents were expert herbal practitioners revealed a notable challenge: many recalled only the illnesses their parents treated but not the specific plants or preparation techniques. This is largely due to the oral nature of knowledge transmission, where plant names and details are often difficult to remember.

Due to religious beliefs, modernization, cultural assimilation, and environmental changes (Mdhluli, 2022, National Institute for the Humanities and Social Sciences, South Africa, Unpublished Doctoral dissertation; Raj and Jhariya, 2023; Atampugbire et al., 2024; Derso et al., 2024), some elderly respondents in this study reported preserving their knowledge of underutilized medicinal plants used for treating viral infections by documenting these plants and maintaining an archive for future generations. They confirmed that they spoke with young people who were eager to learn occasionally about the knowledge of medicinal plants, including the vernacular names of the plants, methods of preparation, diseases treated, and the environments where these plant species are located. At the same time, the lesser-used medicinal plants are frequently kept under wraps. Many asserted that their income stems from the knowledge and use of these plant species for treating a specific disease and so they cannot divulge all their “secrets”. Nevertheless, numerous individuals asserted that the understanding they possess regarding underused medicinal plants for treating viral infections could be lost. This stemmed from the fact that young people, along with their children, are unwilling to learn. Furthermore, it was found that there exist more specific medicinal plants for addressing a certain ailment, with the knowledge primarily limited to a specialized herbal expert or occasionally to a few family members.

The medicinal plant family that was most frequently used but underutilized in this study was Asteraceae. Many plant species within the Asteraceae family are known for their significant medicinal properties, particularly *Vernonia amygdalina*, Launaea taraxacifolia, *Tridax procumbens* and *Chromolaena odorata* (Achika et al., 2014; Bessada et al., 2015; and Rolnik & Olas, 2021). In addition to treating viral infections, some other researcher have reported that these plant species are utilized for ailments such as malaria (Bessada et al., 2015 and Rolnik & Olas, 2021), fever (Michel et al., 2020 and Koc et al., 2015), digestive and intestinal disorder (Suntar, 2014 and Bessada et al., 2015) as well as skin and mucosa inflammations (Baretta et al., 2012 and Gharibi et al., 2016).The majority of the identified plant species were herbaceous, which made them accessible and easy to collect. Plant species which are considered rare and are located in particular areas, suggest that the weather and environmental conditions of the Southwestern region may not support their growth and survival. Additionally, these plant species might be regarded as foreign or introduced species from a different region or habitat. Plant species which were mentioned by at least two interviewees for the treatment of multiple diseases suggested that these plant species are effective for the individuals who utilize them. This illustrates the reliability and consistency of the ethnomedicinal data gathered regarding these plant species.

The ICF value for the infectious viral diseases which were greater than 1, implies that these plant species are employed for disease treatment that are recognized by only a small number of herbal practitioners, resulting in a lower FL. This also indicated that these species face the risk of extinction from both human-induced and natural causes. These anthropogenic activities may encompass urban development, agricultural land expansion, excessive grazing, overexploitation, intentional clearing of bushes, and burning. Drought is regarded as the primary climatic factor decreasing the diversity of these plant species, despite Southwestern Nigeria having favorable climatic conditions with ample rainfall annually. In the meantime, several herbal practitioners noted that numerous medicinal plants they previously gathered in their locality have disappeared, necessitating long journeys, even to different areas.

# 5. CONCLUSION

This research highlighted the importance of indigenous knowledge possessed by herbal practitioners in Southwestern Nigeria for recognizing, detailing, and employing lesser-known medicinal plants in the treatment of viral diseases like Rotavirus Infection, Measles, Mumps, Rabies, Yellow Fever, Pneumonia/Asthma, Poliomyelitis, Hepatitis, Lassa Fever, Viral Meningitis, the Common Cold, Ebola and Smallpox. The knowledge obtained from these native healers uncovered numerous unfamiliar plant species that are vital and potent in addressing different health issues. Maintaining and advancing this knowledge will enhance the sustainable livelihoods of indigenous communities and boost global health security in the event of outbreaks. Consequently, community-based initiatives should be established to enhance the sustainable utilization and preservation of plant species that are scarcely used for treating viral infections.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

Ethical approval

Ethical approval was obtained from Health Research Ethics Committee, Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria and given the number - HREC 2766.

Consent

As per international standards or university standards, respondents’ written consent has been collected and preserved by the author(s).

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