**Medicinal plants used for the management of skin diseases in Odigbo Local Government Area, Ondo State, Nigeria**

**Abstract**

The vast diversity of plants in Nigeria is a promising source of novel compounds that are still relatively unexplored. The major health concerns which affects people of all ages and gender from neonates to the elderly and constitute one of the five reasons for medical consultation is skin diseases. Medicinal plants used traditionally for management of skin diseases in Odigbo Local Government Area of Ondo state was assessed. A total number of 120 respondents comprising of herb sellers, hunters, traditional medicine practitioners, farmers and ordinary community members were selected randomly from six villages within the study areas. The information on several medicinal plants used for traditional management of skin diseases was collected by semi-structured questionnaires administered to the respondents in the local yoruba language. The data collected were analysed using descriptive statistics. The study revealed that 28 plant species from 19 families were used to treat 9 different types of skin diseases either by Topical application, decoction and or oral route. The most represented families are *Fabaceae*, *Euphorbiaceae* and *Meliaceae*. RFC ranged from 0.01 to 0.850. The most cited plant species are *Cassia alata* Linn. (RFC = 0.850), *Ricinus communis* L. (RFC = 0.5916) and *Tetrapleura tetrapetra* (RFC = 0.5083). The least significant family is *Annonaceae* (FIV= 0.005) while the most significant is *Euphorbiaceae* (FIV=0.943). Trees are the most used plant form while bark is the most widely used plant parts (PPV = 0.373). Decoction is the most common method of preparation. In conclusion, it was observed that the respondents have vast knowledge of the uses of the medicinal plants and that the aspect of traditional method of managing skin diseases is completely neglected and should be streamlined into the healthcare delivery system of Nigeria.

Keywords: Medicinal plants, Skin diseases, Traditional medicine practitioners, Decoction, Herb sellers

**Introduction**

“The largest human organ which covers the external part of the body is the skin. It has several functions such as fluid preservation, organ protection, body shape maintenance, temperature regulation, absorption, and eliminating toxins from the body by sweat excretion” (1). “However, along these functions are diseases caused by fungi, bacteria, viruses and parasites which occur all around the world but prevalently in the rural and tropical regions of Asia and Africa” (2). The disease which is the most common, forms about 34% of all the ailments in the rural areas affecting all ages and gender (3). Lack of sanitation, poverty, mal-nutrition, overcrowding, heat, humidity and allergies due to medication are some of the factors attributed to skin diseases in urban and rural areas (4). Examples of skin diseases caused by micro-organisms include ringworm, small pox, boils, itching, rashes, chicken pox, small pox, scabies and psoriasis (5).

“Plants have been used from time immemorial to treat skin infections. The vast diversity of plants in Nigeria is a promising source of novel compounds that are still relatively unexplored. Additional properties such as anti-viral, anti-bacterial, hemostatic, anti-inflammatory, anti-oxidant, anti-cancer and analgesic are also exhibited (4,6,7,8). Many scientific studies have been carried out on some medicinal plants used for the management of skin infections but these researches are not exhaustive” (9). “Notable among the medicinal plants are *Cassia alata, Cassia occidentalis, Mitracarpus villosus, Acalypha wilkesiana, Kigelia Africana,* *Khaya senegalensis,* *Ceiba pentandra,* *Parkia biglobosa,* *Azadirachta* indica, *Rhaphiostylis beninensis,* *Perquetin nigrescens*,*Colocynthis citrullus*, *Funtumia elastica*, *Butyrospetmum* *paradoxum*, *Curculigo pilosa*, and *Setaria* *caudula”* (7). In some parts of Nigeria such as Edo state (10, 11), Nassarawa state (12), Lagos state (13) and Oyo state (14), some research studies have been done on medicinal plants used for the management of skin infections but to the best of our knowledge, there has not been any report so far from Ondo State. The indigenous knowledge of traditional medicinal plants is a valuable tool for targeting potentially active species from the wealth of medicinal plants in Nigeria.

“In Edo state at Umelu village, Ikpoba Okha local government area, a total of 21 plants from 18 families used in the management of skin diseases were documented and that trees provided the highest proportion of plants at 52.38% followed by herbs at 33.33% and shrubs at 14.29%” (11). “The ethno medicinal uses of Plants in the management of skin diseases from Ovia Northeast, Edo State were studied in which 41 plant species from 29 families were identified” (10). “In Keffi, Nasarawa State, 40 plant species belonging to 30 different families used in the management of skin diseases with trees being the most widely used, followed by herbs, shrubs and climbers were documented” (12). “Some phytochemicals such as alkaloids, saponins, tannins, flavonoids, carbohydrates and phenolic compounds present in plants produce a definite physiological action on the human skin for the management of skin diseases” (15).

“The research was undertaken to document information on medicinal plants used in the traditional treatment of skin diseases in Odigbo Local Government area of Ondo State, Nigeria. From the study, new information emerged towards exploring more potentials from other medicinal plants. With developing microbial resistance and need for safe and cost-effective antifungal drugs, screening of plant organs for potential bioactive secondary metabolites becomes indispensable. The indigenous knowledge of traditional medicinal plants will continue to play a major role in primary health care as therapeutic remedies in many developing countries” (8).

# Materials and Methods

## Study area

The study was conducted in Odigbo Local Government Area of Ondo State, Nigeria. It is one of the eighteen local governments in Ondo state. Its headquarters is located at Ore. The whole Local Government Council has an area of 1,818 km2 (702 sq mi). The current census as of 2020 is estimated to be over 600,000 Many parts of the local government are actually inhabited by non-indigenes mostly from Oyo and Osun States, while some parts are occupied by the Ikale people and Ijaws. Some towns and villages under Odigbo are Ore town, Agbabu, Ago Alaye, Oniparaga, Adewinle, Ajue, Ayesan, Ayetoro, Onipetesi, Bolorundoro, Oduduwa village, Ajibodu. The local government shares boundaries with the Ondo people in the north, Ijebu people in the south, the ikales in the east and Osun state in the west. The local government is situated in the tropical rain forest zone of South-western Nigeria which is characterised by two distinct seasons, the raining season and the dry season. There are different tribes and foreign nationals residing in the towns and villages of the local government. This is evident of the friendly and accommodating nature of the people of the south western Nigeria where farming, marketing carpentry and trading are the major occupations practiced in the local government areas. Food Crops such as cassava, maize, yam, pepper, cucumber, watermelon, tomatoes and okra are mostly grown in the areas (16, 17).

## Method of data collection

The interview was conducted with the aid of well-structured questionnaire which was designed to capture the objectives of the study. Yoruba language was used for communication and information obtained was recorded by the researchers**.** Information obtained during the survey includes some medicinal plants used in the management of skin diseases,their local names as well as the parts used and the form in which they are used. Also documented from the respondents were methods of preparation and mode of administration including dosage.The scientific names of plants mentioned were obtained using the publication of (18).

## Sampling procedure and sample size

Six villages were selected within the study area due to the fact that they are situated in the forest and because of the presence of the sample unit under consideration (herbalist, herb seller, hunters and farmers). The villages are Agbabu, Ago Alaye, Adewinle, Ajue, Oduduwa and Ajibodu villages. Stratification of respondent into four strata was carried out in each village, namely Herbalist, Herb-sellers, Hunters and Farmers. In each stratum, 5 respondents were selected randomly thus making 20 respondents in each village and a total number of 120 respondents used as sample size.

## Data Analysis

Descriptive statistics such as tables, bar charts, pie charts, Frequency of Citation (FC), Relative Frequency of Citation (RFC), frequency of family occurrence, frequency of plant parts used, Family Importance Value (FIV) and Plant Part Value (PPV) were used to analyse knowledge of medicinal plants used in the treatment of skin diseases in the study area.

**The Relative Frequency of Citation (RFC)**

The RFC showed the plant species mostly used by the local respondents and it highlights the local importance of each plant species. It is usually calculated by dividing the frequency of citation (FC) by the total number of respondents survey (N). RFC= FC/ N (19),

## Family Importance Value (FIV)

FIV demonstrate the significance of plant families. It is assesses the biological taxon value of plants and is calculated according to the method as described by (20).

**Plant Part Value (PPV)**

Plant part value (PPV) indicates the frequent use of each plants part. The part with the highest PPV is the most used part by respondents. It is calculated using the method as described by (21).

# Results and Discussion

The medicinal plants used in the treatment of skin diseases in the study area were listed on Table 1. The table includes scientific name, botanical family, vernacular name, part used, mode of preparation, therapeutic uses and FC, RFC and FIV data for each of the plant. The table further showed a total number of 28 plant species from 19 botanical families used in the treatments of 9 different skin diseases. These skin disorders include skin rashes, scabies, ring worm, eczema, smallpox, skin disease and pimples, acne and sore wound.

**Family Importance Value**

Family importance value is determined by the increase in the frequency of citations of all plant family. In Table 1, 19 important families were reported. The most representative family are Euphorbiaceae (3 species with FIV= 0.943), Fabaceae- Caesalpinioidea (3 species, with FIV= 0.065) and Meliaceae (3 species, with FIV= 0.178). The families that had 2 species of plants are Combretaceae (2 species, with FIV= 0.055), Fabaceae- Mimisoideae (2 species, with FIV= 0.121) and Moraceae (2 species with FIV= 0.164). Other Families that had single specie are Annonaceae (FIV= 0.005), Apocynaceae (FIV= 0.026), Arecaceae (FIV= 0.012), Asteraceae (FIV= 0.021), Bignoniaceae (FIV= 0.037), Bombacaceae (FIV= 0.025), Connaraceae (FIV= 0.185), Crassulaceae (FIV= 0.222), Lamiaceae (FIV= 0.165), Myrtaceae (FIV= 0.732), Palmae (FIV=0.018), Rubiaceae (FIV= 0.188), Sapotaceae (FIV= 0.186). Euphorbiaceae (3 species) are one of the dominant families in terms of the number of species used in the treatment of skin diseases. According to (22), there are about 8000 species in this family and that the family is the third largest genus of flowering plants second only to *Fabaceae* and Rubiaceae. The family have different compounds like alkaloids, flavonoids, steroids, saponin, phenolic compounds, fatty acid, esters, minerals which showed different activities in human beings and animals (23). It was reported that species of *Euphorbiaceae* are commonly used as remedies against several diseases like cancer, diabetes, diarrhoea, heart diseases, hemorrhages, hepatitis, jaundice, malaria, ophthalmic diseases, rheumatism and scabies (1, 12, 24,25). In this study, respondents indicated three species of *Euphorbiaceae* namely *Euphorbia lateriflora, Jatropha curcas* Linn and *Ricinus communis* L. are used for the management of sore/wound, ringworm and skin disease respectively (Table 1). *Fabaceae- Caesalpinioidea* with three specie namely *Caesalpinia bonduc* (skin rashes), *Cassia alata* (Ring worm, eczema, scabies) and *Cassia occidentalis* (Skin rashes) are used for the management of skin diseases according to the respondents. The studies conducted by (26, 27,28) all supported the traditional uses of the family. The family of *Meliaceae* also fell into this category. The three species namely *Entandrophragma cylindricum*, *Khaya grandifoliola* and *Pseudocedrela kotschyi* are commonly used for the management of skin rashes as indicated by the respondents which is supported by studies carried out by (7,9,29).

Table 1. List of medicinal plants used in the treatment of skin diseases in the study area

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Family and Scientific name** | **Life form** | **Local Name** | **Parts used** | **Mode of**  **Preparations** | **Mode of administration/ application** | **Therapeutic uses** | **FC** | **RFC** | **FIV** |
| **Annonaceae** |  |  |  |  |  |  |  |  | **0.005** |
| *Xylopia aethiopica* | Tree | Eeru | Fruit | Decoction, Grinding | Drinking,  Bathing, Topical | Skin rashes | 12 | 0.01 |  |
| **Apocynaceae** |  |  |  |  |  |  |  |  | **0.026** |
| *Rauvolfia vomitoria* | Shrub | Asofeyeje | Seeds, Roots | Powdering | Bathing with black soap | Skin diseases | 36 | 0.3 |  |
| **Arecaceae** |  |  |  |  |  |  |  |  | **0.012** |
| *Anchomanes difformis* | Herb | Langbodo | Tuber | Infusion | Drinking | Smallpox | 9 | 0.075 |  |
| **Asteraceae** |  |  |  |  |  |  |  |  | **0.021** |
| *Ageratum conyzoides* | Herb | Imi esu | Leaves | Grinding, Decoction | Paste, Bathing | Sore/ wound Skin rashes | 6 | 0.05 |  |
| **Bignoniaceae** |  |  |  |  |  |  |  |  | **0.037** |
| *Kigelia africana* | Climber | Pandoro | Leaves/ vine | Decoction | Drinking | Skin rashes | 27 | 0.225 |  |
| **Bombacaceae** |  |  |  |  |  |  |  |  | **0.025** |
| *Bombax buonopozense* | Tree | Ponpola | Bark | Decoction | Drinking | Skin rashes | 8 | 0.0667 |  |
| **Combretaceae** |  |  |  |  |  |  |  |  | **0.055** |
| *Anogeissus leiocarpus* | Tree | Ayin | Bark | Decoction | Drinking | Skin rashes | 28 | 0.2333 |  |
| *Terminalia glaucescens* | Tree | Idi-apata | Bark | Decoction | Drinking | Skin rashes | 10 | 0.0833 |  |
| **Connaraceae** |  |  |  |  |  |  |  |  | **0.185** |
| *Byrsocarpus coccineus* | Climber | Amuje | Leaves/Vine | Decoction | Drinking | Skin rashes | 42 | 0.35 |  |
| **Crassulaceae** |  |  |  |  |  |  |  |  | **0.222** |
| *Bryophyllum pinnatum* | Herb | Abamoda, Odundun | Latex | Squeezing | Topical | For eczema, pimples, acne | 38 | 0.317 |  |
| **Euphorbiaceae** |  |  |  |  |  |  |  |  | **0.943** |
| *Euphorbia lateriflora* | Shrub | Enuopiri | Leaves | Grinding | Topical | Sore/ wound | 49 | 0.4083 |  |
| *Jatropha curcas* | Shrub | Lapalapa funfun | Leaves | Squeezing | Topical | Ringworm | 55 | 0.458 |  |
| *Ricinus communis* | Shrub | Ewe laa | Seeds | Grinding | Bathing | Skin disease | 71 | 0.5916 |  |
| **Fabaceae- Caesalpinioideae** |  |  |  |  |  |  |  |  | **0.065** |
| *Caesalpinia bonduc* | Climber | Seyo, Ayo | Leaves | Decoction | Drinking | Skin rashes | 44 | 0.3667 |  |
| *Cassia alata* | Shrub | Asuwon- oyinbo | Latex, Bark | Squeezing, Decoction | Rubbing, Drinking | Ring worm, eczema, scabies, | 102 | 0.850 |  |
| *Cassia* *occidentalis* | Shrub | Iya omo, Rere | Bark | Decoction | Drinking | Skin rashes | 18 | 0.15 |  |
| **Fabaceae-Mimisoideae** |  |  |  |  |  |  |  |  | **0.121** |
| *Parkia biglobosa* | Tree | Igbaru | Bark | Decoction | Drinking | Skin rashes | 22 | 0.1833 |  |
| *Tetrapleura tetrapetra* | Tree | Aidan | Pods | Decoction | Drinking | Skin rashes | 61 | 0.5083 |  |
| **Lamiaceae** |  |  |  |  |  |  |  |  | **0.165** |
| *Vitex doniana* Sweet | Tree | Oori | Leaves | Squeezing | Topical | Ring worm | 12 | 0.100 |  |
| **Meliaceae** |  |  |  |  |  |  |  |  | **0.178** |
| *Entandrophragma cylindricum* | Tree | Ijebo | Bark, Leaves | Decoction | Drinking | Skin rashes, Sore/ wound | 61 | 0.5083 |  |
| *Khaya grandifoliola* | Tree | Oganwo | Bark | Decoction | Drinking | Skin rashes | 43 | 0.3583 |  |
| *Pseudocedrela kotschyi* | Tree | Emi gbegiri | Bark | Decoction | Drinking | Skin rashes | 16 | 0.1333 |  |
| **Moraceae** |  |  |  |  |  |  |  |  | **0.164** |
| *Antiaris toxicaria var. africana* | Tree | Oro | Bark | Decoction | Drinking | Skin rashes | 19 | 0.1583 |  |
| *Ficus exasperata* | Tree | Epin, Ipin | Leaves | Squeezing | Topical | Ring worm | 21 | 0.175 |  |
| **Myrtaceae** |  |  |  |  |  |  |  |  | **0.732** |
| *Syzygium guineense* | Tree | Oori | Bark | Decoction | Drinking | Skin rashes | 25 | 0.2083 |  |
| **Palmae** |  |  |  |  |  |  |  |  | **0.018** |
| *Elaeis guineensis* | Tree | Ope | Oil | Extraction | Topical | Skin rashes | 9 | 0.075 |  |
| **Rubiaceae** |  |  |  |  |  |  |  |  | **0.188** |
| *Sarcocephalus latifolius* | Tree | Egbesi | Bark | Decoction | Drinking | Skin rashes | 63 | 0.525 |  |
| **Sapotaceae** |  |  |  |  |  |  |  |  | **0.186** |
| *Chrysophyllum albdium* | Tree | Agbalumo | Leaves | Decoction | Drinking | Skin rashes | 16 | 0.1333 |  |

**Relative Frequency of Citation (RFC)**

The most prominent plant species usually used for the treatment of skin diseases based on the ratio between the frequency of citation (FC) by the respondents and the total number of respondents survey (N) indicates the Relative Frequency of Citation (RFC). It reflects the frequency of each plant species used in the treatment of skin diseases in the study area. In the selection of medicinal plant species with high potential for future research in the formulation of skin disease poly-herbal drug, relative frequency of citation (RFC) has crucial role to play. In this study, the RFC ranges from 0.01 to 0.85 with the highest representation of species such as *Cassia alata* (RFC = 0.85), *Ricinus communis* (RFC =0.5916), *Sarcocephalus latifolius* (0.525), *Entandrophragma cylindricum* and *Tetrapleura tetrapetra* (RFC = 0.5083), *Jatropha curcas* (RFC=0.458), *Euphorbia lateriflora* (RFC=0.4083), *Caesalpinia bonduc* (RFC=0.,3667), *Byrsocarpus coccineus* (RFC=0.35), *Khaya grandifoliola* (RFC = 0.3583), *Bryophyllum pinnatum* (RFC = 0.317)*, Rauvolfia vomitoria* (RFC = 0.3), *Anogeissus leiocarpus* (RFC = 0.233)*, Kigelia africana* (RFC = 0.225), *Syzygium guineense* (RFC = 0.2083) *Parkia biglobosa* (RFC = 0.183), *Ficus exasperate* (RFC = 0.175), *Antiaris toxicaria* (RFC = 0.1583), *Cassia* *occidentalis* (RFC = 0.15) *Chrysophyllum albdium* and *Pseudocedrela* kotschyi (0.133), *Vitex doniana*(RFC = 0.1) *Terminalia glaucescens*(RFC = 0.0833), *Anchomanes difformis and Elaeis guineensis* (RFC = 0.075), *Bombax buonopozense* (RFC = 0.0667), *Ageratum conyzoides* (RFC = 0.05), *Xylopia aethiopica* (RFC = 0.01). This is an indication of the plant species in the management of various skin diseases. Plants species with high RFC can be further analysed to evaluate their phytochemical and pharmacological compounds for drug development. Secondary metabolites such as saponins, tannins, terpenoids, anthraquinones, alkaloids, and flavonoids have pharmacological properties, and they are present in the plant species (6,30, 31, 32, 33, 34, 35).

**Plant parts used for remedy preparation**

In this study, it was observed that different plant parts such as leaves, fruits, seeds, bark, roots, latex, tubers and oils were used in the preparation of herbal remedies for the management of skin diseases. Out of the twenty eight (28) medicinal plants identified, twenty three (23) have only one of their parts used while five (5) have more than a part used (Table 2). Our results showed that life form of plants used include herb (3), climbers (3), shrubs (6) and trees (16) Fig.1. Records shows that parts such as fruits, roots, tuber and oil were reportedly used by some respondents alone without adding other parts in the management of skin diseases. Vine, seed and latex of six (6) medicinal plants were used. Leaves of ten (10) medicinal plants were used while bark of twelve (12) medicinal plants were also reportedly used (Fig.2). Though the use of fruits, oil, tuber, vine and latex may not threaten the sustainability of the medicinal plants, however, that cannot be said of the use of bark and roots (36, 37,).

**Mode of preparation of recipes**

There are different methods of preparations as reported by the respondents. This include decoction, grinding, squeezing, extraction, powdering and infusion. Our results show that decoction (61.29%) was the most preferred method of preparation of recipes when it comes to treatment of skin diseases in the study area. Squeezing (16.13%) of leaves to extract the juice was widely practiced by the respondents while grinding (12.9%) was also commonly practiced. However, powdering, infusion and extraction had equal percentage of 3.23%. The results obtained agreed with the findings by several scientists such as (12, 38, 39, 40, 41, 42, 43). Almost all the respondents agreed that plants combination is very important in the management of skin infections because of synergy observed (2).

**Mode of administration/ application of recipes**

In the management of skin infections, the mode of administration/application of herbal recipes includes drinking, bathing and topical application such as paste. It is generally believed that skin infection emanates from within before its outward manifestation thus the infection causing organisms are in the blood. Some recipes were, however, reported to have more than one method of administration/application. In most cases, the oral administration was usually reported to be followed by other topical applications such as bathing, paste, rubbing and infusion (39).

Table 2. Plant combinations used to treat skin disease in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| **Plant species combination** | **Part used** | **Skin disorder treatment** | **Method of preparation** |
| *Khaya grandifoliola* +  *Entandrophragma cylindricum* + *Xylopia aethiopica* + *Cassia occidentalis* + *Byrsocarpus coccineus* | Bark + bark + fruit + bark + leaves | Skin rashes | The herbs are usually collected together, put in a covered pot and boiled with clean water. Half stainless cup three times daily was recommended. |
| *Khaya grandifoliola* + *Xylopia aethiopica*  + *Antiaris toxicaria* | Bark + fruit + bark | Skin rashes | *Xylopia aethiopica* fruit is boiled with barks of *Xylopia aethiopica* and *Antiaris toxicaria*. Half stainless cup of the decoction is recommended to be taken orally three times daily. The decoction is also used to bath regularly. |
| *Khaya grandifoliola* + *Xylopia aethiopica* + *Sarcocephalus* + *Kigelia africana* +  *Chrysophyllum albdium* | Bark + fruit + bark + leaves + leaves | Skin rashes | After boiling the herbs, half stainless cup should be taken twice daily (morning and night). |
| *Terminalia glaucescens* + *Parkia biglobosa* + *Syzygium guineense*  + *Tetrapleura tetrapetra* | Bark + bark + bark + pod | Skin rashes | Take half stainless cup twice daily (morning and night) after all the herbs have been boiled together and allowed to cool |
| *Bombax buonopozense* + *Byrsocarpus coccineus* + *Pseudocedrela kotschyi* + *Cassia occidentalis* | Bark + leaves/vine + bark + bark | Skin rashes | All the herbs are boiled together in a container. Drink half stainless cup twice daily (morning and night). |
| *Euphorbia lateriflora* + *Xylopia aetiopica* | Leaves +  fruit | Sore skin | The leaves of *Euphorbia lateriflora* with *Xylopia aetiopica* are grinded together and mixed with black or local soap. The paste obtained is put on the sore |
| *Ageratum conyzoides* | leaves | Skin rashes | Decoction of the leaves is applied on the rashes so also is the powdered leaves |
| *Vitex doniana* | Leaves | Ringworm | Apply the squeezed extract of the leaves to the spot on the skin |

**Fig .1 life form of medicinal plants**

**Fig 2.Plants parts used in the treatment of skin infections**

**Conclusion**

This study showed the vast knowledge of the respondents in the management of skin infections with medicinal plants. It was observed that the medicinal plants have little or no side effect with prolonged usage. We identified 28 plants from 19 families used for the management of skin infections. The medicinal plants have been reported to have many useful advantages such as little or no side effects, relatively less expensive, patient’s tolerance and wide acceptability due to long history of use. The most widely used form are the trees and the most widely used part is the bark while decoction is the most common method of preparation. The medicinal plants have been proven to contain phytochemical constituents with great pharmacological activities for the management of skin diseases.

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 the writing or editing of this manuscript.

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