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Research Article

Ethnobotanical Survey of Medicinal Plants Used against Fungal Ailments in Niger State, North-Central Nigeria

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Abstract

Medicinal plants contain some significant bioactive agents that can be integrated pharmaceutically, in order to reduce or eliminate the menace of fungal, viral, bacterial and parasitic infections. The purpose of this study was to examine the active medicinal plants used in traditional medicine to treat fungal ailments in Niger State. An ethnobotanical survey was administered among herbalists, healers, spiritualists, farmers, hunters, elders, students and other individuals having knowledge of medicinal plants which is in line with the studies conducted by Alfa., *et al*. in 2018 and Mukaila., *et al*. in 2021. A photographs showing common and easily recognizable tinea infections (ringworm), other fungal ailments and semi structured questionnaire were used to support a live interview. All medicinal plants examined in this study have ethnomedicinal ability that can be used in the treatment of tinea infections. *Waltheria indica*, *Allium sativum* and *Kigelia africana* are used in the treatment of Candidiasis, Aspergillosis, Vaginitis and ringworm. Bida had the highest frequency distribution of medicinal plants used against fungal diseases followed by Lapai (10.36%) and Agaie (7.77%). During this study, 34 medicinal plant species belonging to 22 families have been examined. Fabaceae were the most predominated family with 9 medicinal plant species. The most used parts were leaves (25.47%). The decoction is the most used method of preparation (22.55%) while the oral is the most frequent route of administration (56.67%). Niger State has significant medicinal plants biodiversity that are used by residents in the management of fungal ailments and other infections.

Keywords: *Medicinal Plants; Fungal Ailments; Ethnobotanical Survey; Ringworm; Fabaceae; Niger State; Traditional Medicine*

Introduction

Niger is a largest state in Nigeria, located in the middle belt and consists of 25 local government area [1]. Their climate, seasonal deposition of fluvial materials, available phosphorus and moderate soil acidic content attracts the existence and growth of numerous medicinal plants and have good potential for sustainable arable agriculture. Fungal disease is a public health challenge in tropical countries and is often neglected [2]. Myriad of years ago, traditional medicine has been used by farmers, herbalists, spiritualists, healers and hunters in the treatment of human and animal diseases [3]. The traditional knowledge of medicinal plants is being transmitted from one generation to another generation as a result of experiences gathered by people in connection with their nature and habitats [4]. Medicinal plant was the source for about 50% of newly approved pharmaceutical drugs for over 40 years ago [5]. In tropical countries more than 70% of the

population depends on medicinal plants for the treatment of various ailments [3,6]. The intensive and frequent use of medicinal plants for the treatment of ailments is due to its acceptability, availability, affordability and accessibility in the community [7]. Medicinal plants are natural, having few side effects and available. The use of nutraceuticals, traditional medicine and herbal cosmetics has been increasing in developing countries [8]. The scientific evaluation based on the efficacy and preventive measures of medicinal plant products and practices is limited. However, pharmacologists, ethnobiologists, ethnobotanists, economic botanists and medicinal chemists are currently working to compile eligible records in order to preserve medicinal plant species and new bioactive molecules which could be integrated into an effective pharmaceutical drugs [4]. Screening of medicinal plant portions against a wide range of fungal pathogens is vexatious and demands potential modern technology for the implementation. Japanese Kampo Medicine, Ayurveda, Traditional Chinese Medicine, Yunani and Siddha have increases the development of new bioactive compounds extracted from medicinal plants that may be subsequently developed clinically [8]. Novel bioactive compounds are currently needed in the management of numerous fungal ailments such as ringworm, Candidiasis and Aspergillosis. Most of fungal diseases usually affecting cancer patients receiving chemotherapy, premature infants, transplant, burn and immunocompromised patients and other vulnerable individuals [9]. Africa represents one of the important centers of medicinal plant knowledge for the treatment of various fungal diseases. The epidemiology data evaluates that at least 5 of every 1000 risk individuals will be contracted with *Candida* species into their blood stream. More than 30% of the patients will die as a result of the complication of *Candida* infection and 30% will die as a result of an underlying fungal infection [9]. Apparently, numerous of antifungal drugs are commercially available. Many of these drugs are highly resistance to pathogenic fungi and shows serious advert effects [11]. Centers for Disease Control (CDC) reported in the United States that a resistant fungal strain of *Candida albicans* is responsible apparently for 3,400 cases of both blood stream and superficial infections every year. Currently, fungal disease is a public health challenge where new bioactive compounds are urgently needed and medicinal plants are apparently the new source of these compounds [12]. Ethnobotanical survey of medicinal plants used against ailments have been evaluated in many African countries including Nigeria [23]. Screening of medicinal plants against a broad range of fungal pathogens will support bio-prospecting, which may eventually lead to new antifungal drugs development. Therefore, it is necessary to carry out a survey to document the medicinal plants used against fungal infections in Niger State.

Materials and Methods

Study area

Niger is a state in the middle Belt of Nigeria and the largest state in the country. The population of Niger state was approximately 3,954,772 based on the NPC (2006). In Niger State, there are two of Nigeria's major hydroelectric power station and Kainji National Park, the largest National Pack of Nigeria. Niger state is lying on latitude 3.2° East and Longitude 11.30° North, the state shares a country border with the Republic of Benin (West) and State borders within Nigeria. These include Zamfara (North), Federal Capital Territory (FCT) on the South-East, Kebbi (North-West), Kwara (South-West) and Kaduna (North-East). Niger State consists of 25 local government area. It straddles the southern Sudanian and northern Guinean climatic zones, historically been sparsely populated. The climate is very warm with an annual average of 34°C, but has few truly tropical and sultry months. It is yearlong warm or hot. Humidity is unpleasantly high 34% from June - September. The most rain days occur from May - October. Annual rainfall varies from year to year, but generally is lower in the north (100 - 200 mm) than in the south (500 - 600m) and is limited to the summer months of June - September. Niger state cover area of 76, 363 km^2 (29, 484 sq mi). Niger state is populated mainly by the Nupe people in the south, the Gwari in the east, the Busa in the west, and Kamberi (Kambari), Hausa, Fulani, Kamuku, and Dakarki (Dakarawa) in the north. Islam is the predominant religion. Most of the inhabitants are engaged in farming. Cotton, shea nuts, yams, and peanuts (groundnuts) are cultivated both for export and for domestic consumption. Sorghum, millet, cowpeas, corn (maize), tobacco, palm oil and kernels, kola nuts, sugarcane, and fish are also important in local trade. Paddy rice is widely grown as a cash crop in the floodplains of the Niger state especially in the area around Bida. Cattle, goats, sheep, chickens, and guinea fowl are raised for meat. Pigs are raised around Minna for sale to southern Nigeria. Gold, tin, iron, and quartz are mined mainly for local craftsmen. Pottery, brass work, glass manufactures, raffia articles, and locally dyed cloth are significant

exports. Marble is quarried at Kwakuti, near Minna. The Kainji Dam and part of its reservoir, Kainji Lake, also lie in the state. Besides generating hydroelectric power, the dams sustain irrigation projects and fishing has developed as an industry on their reservoirs. Near Bida there is a rice research institute and an agricultural research station.

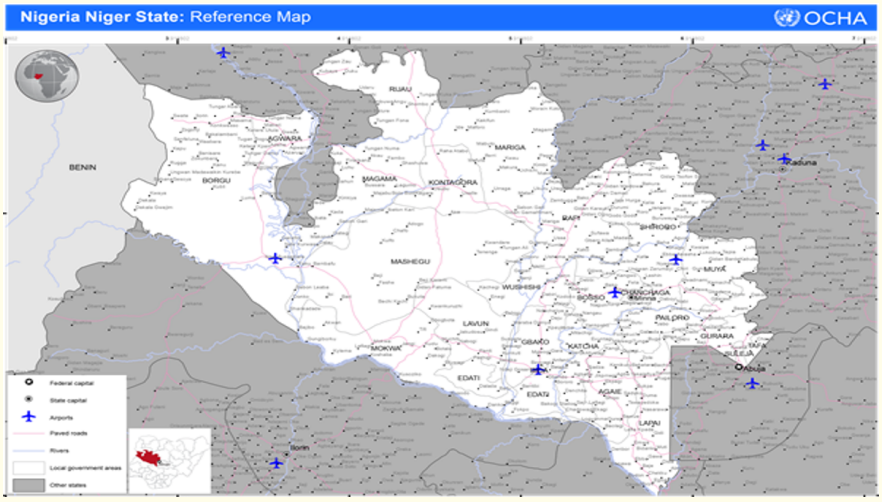

Figure 1: *UNCS, International Organization for Migration, World Health Organization (www.unocha.org/nigeria).*

Sample methods

An ethnobotanical survey was conducted in all Local Government Area of Niger State, to examine the medicinal plants used to treat fungal diseases in their community. During this study, direct interviews have been conducted among herbalists, healers, spiritualists, farmers, hunters, elders, students and other individuals having knowledge of medicinal plants used against fungal infections. As Alfa., *et al*. [3] in 2018, photographs showing easily recognizable and common tinea infections (ringworm) and other fungal infections have been used to make interviewees aware of the fungal diseases with regard to the active medicinal plants used to treat such ailments. The interviewee is included if only he/she have these three touchstones:

1. Has recognized at least one tinea infection or any other fungal infection.
2. Knows at least one active medicinal plant that can be used to treat fungal infection.
3. Can identify and collect a sample of the medicinal plant in the community.

The information was gathered in English and local language (Nupe) via open-ended conversations and semi-structured questionnaire. At each interview stage, the information that were collected on an identity card includes age and gender, local name of the medicinal plant, date and place of collecting information, profession, education, ailment healed, part of the plant being used, mode of preparation and route of administration. The medicinal plant sample collected is pressed, labelled with its local and Nupe name and send to the botanists at Ibrahim Badamasi Babangida University for identification.

Data analysis

Descriptive statistics (Frequency and percentage) of the distribution of medicinal plants, families, plant parts used, method of preparation and route of administration of medicinal plants used against fungal ailments were enumerated and subjected to graphic profile using IBM® SPSS® Statistics version 25.0 (IBM® Corp., Armonk, NY, USA).

Results

Participants

A total of 157 participants from all local government area of Niger State, aged from 20 to 100 years have significantly took part in this research study. Majority of the participants are male (64.33%). The majority of the interviewees were aged from 31 to 40 years (28.03%). Most of the interviewees are herbalists (35.67%) and literate (59.87%). Significant portion of the participants were local individuals and herbalists (Table 1).

Bio data		Frequency	Percentage (%)
Gender	Male	101	64.33
	Female	56	35.67
Age	20 - 30	21	13.38
	31 - 40	44	28.03
	41 - 50	31	19.75
	51 - 60	22	14.01
	61 - 70	16	10.19
	71 - 80	11	07.01
	81 - 90	08	05.09
	91 - 100	04	02.55
Education	None	63	40.13
	Basic	44	28.03
	Secondary	38	24.20
	Tertiary	12	07.64
Occupation	Herbalists	56	35.67
	Healers	36	22.93
	Spiritualists	18	11.46
	Farmers	17	10.83
	Hunters	11	07.01
	Elders	08	05.10
	Students	07	04.46
	Others	04	02.55

Table 1: *Demographic data of the participants.*

Medicinal plants diversity used against fungal infections in Niger State

In this study, 34 medicinal plant species distributed in 22 families were identified as being used to treat fungal infections and other ailments. The most predominant family was the Fabaceae with 9 species, followed by Malvaceae with 3 species and Proaceae; Amaryllidaceae with 2 species each. Other families have one species.

S/N	Family	Scientific Name	Nupe Name	Ethnomedicinal Use	Plant Part Used	Method of Preparation	Route of Administration	Locations (L.G.A)
1.	Malvaceae	*Waltheria indica*	Ankufa	Tinea Infections, Candidiasis, Aspergillosis and Vaginitis.	Leaves	Boiling	Oral	Bida, Lavun, Agaie, Lapai, Mokwa and Katcha.
2.	Malvaceae	*Sterculia setigera*	Bokoci	Tinea Infections, Leprosy, Syphilis and Bronchitis.	Stem bark, Latex or Leaves.	Boiling, Poultice or Powder	Oral or Topical	Lapai, Paikoro, Edati and Bida
3.	Poaceae	*Eleusine indica*	Cincere	Tinea Infections, Asthma, Malaria and Influenza	Leaves or Roots	Decoction or Poultice	Oral or Topical	Wushishi, Gbako, Agaie, Lapai and Bida
4.	Nymphaeaceae	*Nymphaea lotus*	Dinkoro	Tinea Infections, Diarrhea, Enteritis and Diabetes	Roots, Flowers or Seeds	Juice, Powder or Boiling	Oral or Topical	Bida, Lapai, Borgu, Tafa and Rafi
5.	Fabaceae	*Tamarindus indica*	Dara	Tinea infections, Cough, Intestinal worms, Conjunctivitis, Malaria and Diarrhea	Leaves, Flowers or Fruits	Decoction, Maceration or Powder	Oral or Topical	Rijau, Mariga, Suleja and Lapai
6.	Connaraceae	*Byrocarpus coccineus*	Darabagi	Tinea Infections, Measles, Urinary Tract Infections and Gonorrhea	Leaves or Roots	Decoction or Infusion	Oral	Agwara, Shiroro and Bida
7.	Fabaceae	*Indigofera spicata*	Ese gbeji	Tinea infections, Tonsillitis, Diarrhea and Ascariasis	Roots or leaves	Boiling	Oral	Bida, Gurara, Munya and Magama
8.	Poaceae	*Imperata cylindrica*	Eto	Tinea Infections, Urinary Tract Infections, Oedema and Jaundice	Leaves, Roots or Stem bark	Extracts, Maceration or Boiling	Oral or Topical	Mashegu, Bosso, Gbako and Lapai
9.	Fabaceae	*Parkia biglobosa*	Elo	Tinea infections, Bronchitis, Toothaches, Bilharzia, Ulcers, Oedema and Malaria	Stem bark, Leaves, Seeds or Roots	Boiling, Extract, Decoction or Powder	Oral or Topical	Agaie, Lavun, Chanchaga and Gurara
10.	Sapotaceae	*Vitellaria paradoxa*	Eko Kpara	Tinea Infections, Jaundice, Nasal congestion and Dermatitis	Leaves, Roots, Stem bark or Fat	Boiling, Infusion, Poultice or Maceration	Oral or Topical	Bida, Katcha, Kontagora and Agwara
11.	Capparaceae	*Crateva adansonii*	Kulanci	Tinea Infections, Yellow fever and Syphilis	Leaves, Stem bark, Roots or Seeds	Powder, Boiling or Soaking	Oral	Mashegu, Paikoro, Wushishi, Agaie, Lapai and Bida
12.	Moraceae	*Ficus sur*	Gbanci bokun	Tinea infections, Gonorrhea, Fevers, Cough, Tuberculosis, Ulcers and Tonsillitis	Latex, Roots, Leaves or Stem bark	Chewed, Decoction, Infusion or Boiling	Oral or Topical	Rafi, Suleja, Kontagora, Agwara and Mariga

13.	Rubiaceae	*Gardenia ternifolia*	Langba	Tinea infection, Kwashiorkor, Stomach aches and Fever	Roots or Leaves	Decoction or Boiling	Oral	Bida, Lapai and Agaie
14.	Fabaceae	*Pterocarpus santalinoides*	Gbangogi	Tinea infections, Syphilis, Herpes infections, Ulcers and Gonorrhea	Stem bark, Roots or Leaves	Decoction	Oral	Shiroro, Lavun, Gbako, Edati and Wushishi
15.	Anacardiaceae	*Mangifera indica*	Mangoro	Tinea infection, Scorpion stings, Hemorrhage, Stomach aches and syphilis	Seeds, Stem bark, Roots, Flowers or Fruits	Decoction, Steaming, Poultice or powder	Oral or Topical	Munya, Agaie, Bida, Suleja, Lavun, Chanchaga and Rafi
16.	Fabaceae	*Erythrina senegalensis*	Eshe cigba	Tinea infections, Syphilis, Conjunctivitis, Gonorrhea, Measles, Malaria, Ulcers, Snake bites and Schistosomiasis	Roots, Flowers, Leaves or Stem bark	Decoction, Powder, Poultice or Soaking	Oral or Topical	Bosso, Tafa, Mariga, Edati, Gbako, Lavun and Lapai
17.	Amaryllidaceae	*Allium cepa aggregatum*	Alubasa	Tinea infections, Arteriosclerosis and Heart attack	Bulb	Juice, Poultice, Boiling or Chewing	Oral or Topical	Rafi, Paikoro, Bida, Munya, Gurara and Bosso
18.	Amaryllidaceae	*Allium sativum*	Tafarnuwa	Tinea infections, Candidiasis and Vaginitis	Bulb	Poultice, Chewing or Boiling	Oral or Topical	Bida, Agaie, Suleja, Kontagora, Gurara and Lavun
19.	Amaranthaceae	*Amaranthus spinosus*	Eka shanshangi	Tinea infections, Diarrhea, Internal bleeding, Opthalmia, Urinary tract infection, Menorrhagia, Gonorrhea and Eczema	Seeds, Roots or Sap	Poultice, Paste or Juice	Oral or Topical	Bosso, Katcha, Agaie, Mokwa, Edati, Lapai, Lavun, Bida, Rafi and Mariga
20.	Rutaceae	*Citrus aurantiifolia*	Lemubakagi	Tinea infections	Fruits or Leaves	Boiling or Poultice	Oral or Topical	Bida, Edati, Mariga, Gurara, Rafi, Kontagora, Agaie, Suleja and Wushishi
21.	Fabaceae	*Parkia biglobosa*	Lonci	Tinea infections, Guinea worm, Toothache, Oedema, Bronchitis, Pneumonia, Bilharzia and Poison antidotes	Seeds, Leaves, Roots or Stem bark	Decoction, Powder, Chewing, Boiling or Infusion	Oral or Topical	Lapai, Magama, Bosso, Gbako, Paikoro and Rijau
22.	Asphodelaceae	*Aloe lateritia*	Eci dungi	Tinea infections, Anemia, Malaria and Hepatitis	Leaves or Roots	Decoction or Rubbing	Oral or Topical	Bida and Katcha
23.	Bignoniaceae	*Kigelia africana*	Beci	Tinea infections, Candidiasis, Gonorrhea, Anemia, Syphilis and Epilepsy	Fruits, Stem bark, Wood or Roots	Decoction, Powder, Rubbing or Infusion	Oral or Topical	Gbako, Paikoro, Edati, Bida, Lapai, Chanchaga and Mokwa
24.	Euphorbiaceae	*Croton lobatus*	Elugi	Tinea infections, Ulcers, Guinea worm and Scorpion stings.	Leaves, Roots or Flowers	Decoction, Boiling, Rubbing or Maceration	Oral or Topical	Wushishi, Agaie, Kontagora, Lapai, Borgu, Mashegu and Tafa

25.	Fabaceae	*Senna italica*	Filasiko	Tinea infections, Ulcers and Influenza	Leaves, Seeds or Pods	Decoction, Maceration, Infusion or Boiling	Oral or Topical	Lavun, Agaie, Bida, Wushishi, Shiroro, Chanchaga and Bosso
26.	Meliaceae	*Azadirachta indica*	Nimu	Tinea infections, Ulcers, Leprosy, Pimples, Hepatitis, Malaria and Gum disease	Stem bark, Leaves, Roots or Oil	Decoction, Boiling, Chewing or Poultice	Oral or Topical	Mariga, Rijau, Agaie, Lapai, Edati, Bida, Lavun, Suleja, Magama, Borgu, Paikoro, Wushishi, Agwara and Chanchaga
27.	Fabaceae	*Tephrosia purpurea*	Sabanigi	Tinea infections, Diarrhea, Intestinal worms, Bronchitis and Body pains	Leaves, Fruits or Roots	Decoction, Extracts or Poultice	Oral or Topical	Lapai, Edati, Tafa, Mashegu, Lavun, Bida, Paikoro and Shiroro
28.	Lauraceae	*Cassytha filiformis*	Soko cecengi	Tinea infections, Malaria and Hepatitis	Stem bark	Infusion, Decoction or Boiling	Oral	Mokwa, Agaie, Tafa, Lavun, Rafi, Bosso, Paikoro and Lapai
29.	Apocynaceae	*Laptadenia hastata*	Yadiya	Tinea infections, Leprosy, Syphilis and Trypanosomiasis	Latex, Sap, Roots or Leaves	Maceration, Decoction or Poultice	Oral or Topical	Lapai, Bida and Agaie
30.	Moringaceae	*Moringa oleifra*	Tambo yakagi	Tinea infections, Ulcers, Boils and Snake bites	Leaves, Roots, Stem bark, Gum, Flowers, Seeds or Oil	Boiling, Decoction or Juice	Oral	Tafa, Lavun, Agaie, Gbako and Mariga
31.	Malvaceae	*Abelmoschus esculentus*	Kpamfini	Tinea infections, Dysuria, Catarrhal infections and Gonorrhea	Leaves, Fruits, Seeds or Flowers	Poultice, Decoction or Infusion	Oral or Topical	Lavun, Bida, Mokwa, Chanchaga, Gbako and Lapai
32.	Sapindaceae	*Blighia sapida*	Yila	Tinea infections, Anemia, Yellow fever, Epilepsy and Oedema	Stem bark, Leaves, Fruits or Seeds	Decoction, Rubbing or Poultice	Oral or Topical	Lapai, Rijau, Bosso and Mashegu
33.	Fabaceae	*Prosopis africana*	Saci	Tinea infections, Headache, Toothache and Rheumatism	Leaves, Roots or Stem bark	Decoction or Poultice	Oral or Topical	Katcha, Suleja, Munya and Bosso
34.	Lamiaceae	*Vitex doniana*	Dinci	Tinea infections, Gastroenteritic infections and Chickenpox	Stem bark, Fruits, Roots and Leaves	Decoction, Chewing or Boiling	Oral or Topical	Shiroro, Mariga, Agwara, Gbako and Lapai

Table 2: *Medicinal plants used in the treatment of fungal infections and other ailments.*

Locations (Local government area)

In this study, Bida had the highest frequency distribution of medicinal plant species of 21.00 (10.88%) that can be used to treat different fungal infections followed by Lapai with 20.0 (10.36%) and Agaie with 15.00 (7.77%) respectively (Figure 2).

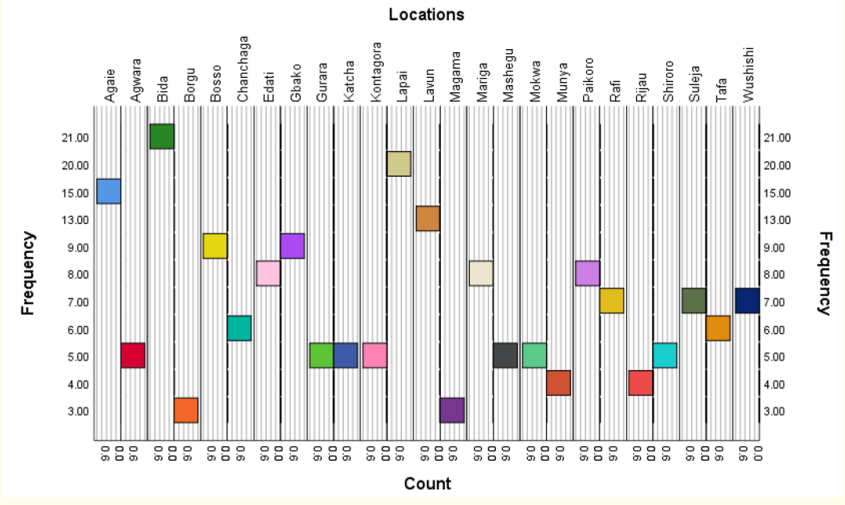

Figure 2: *Frequency distribution of the locations (Local Government Area) based on the prevalent of medicinal plant species used against fungal infections.*

Botanical families

The medicinal plant species listed in figure 3 belong to diversity of botanical families from table 1. Fabaceae had the highest frequency distribution of 9.00 (40.91%), followed by Malvaceae with 3.00 (13.64%) and Poaceae; Amaryllidaceae with 2.00 (9.09%) each. Other families had the lowest frequency distribution of 1.00 (4.55%) each.

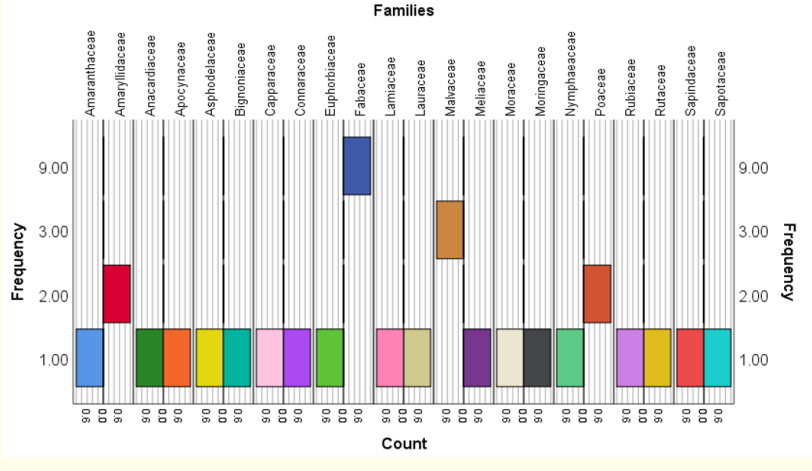

Figure 3: *Families of medicinal plants used in the treatment of fungal infections.*

Plant parts

Leaves are the major plant parts used for the treatment of fungal infections with the highest frequency distribution of 27.00 (25.47%), followed by roots with 24.00 (22.64%) and stem bark with 17.00 (16.04%) respectively (Figure 4).

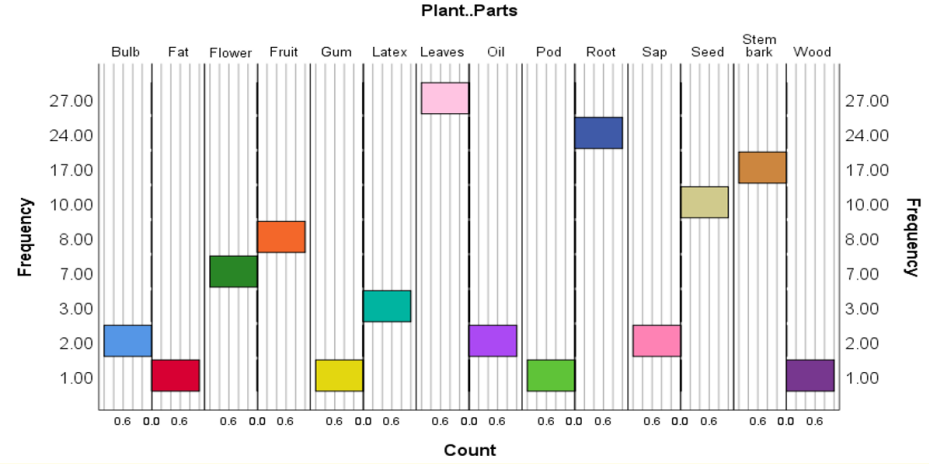

Figure 4: *Plant parts used in the treatment of fungal infections.*

Method of preparation

Decoction had the highest frequency of 23.00 (22.55%), followed by boiling with 20.00 (19.61%) and poultice with 15.00 (14.71%) respectively (Figure 5).

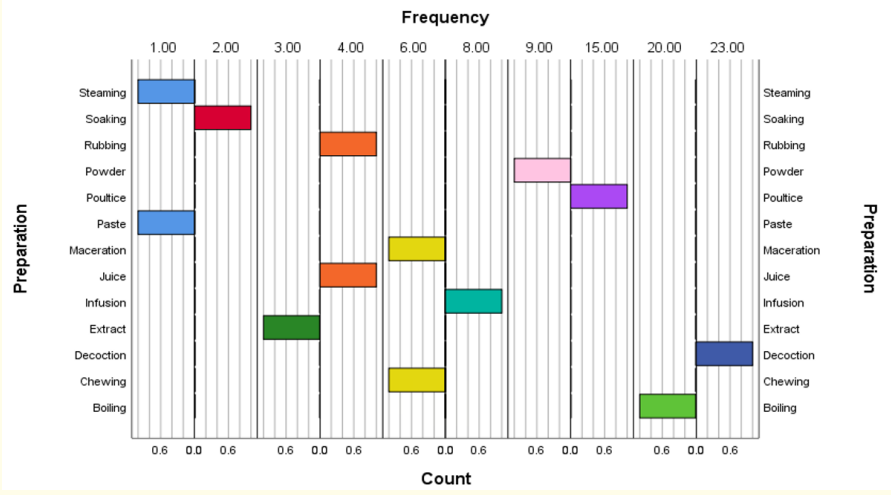

Figure 5: *Method of preparation of medicinal plants used in the treatment of fungal infections.*

Route of administration

In this study, oral route had the highest frequency of 34.00 (56.67%) compared to topical with 26.00 (43.33%).

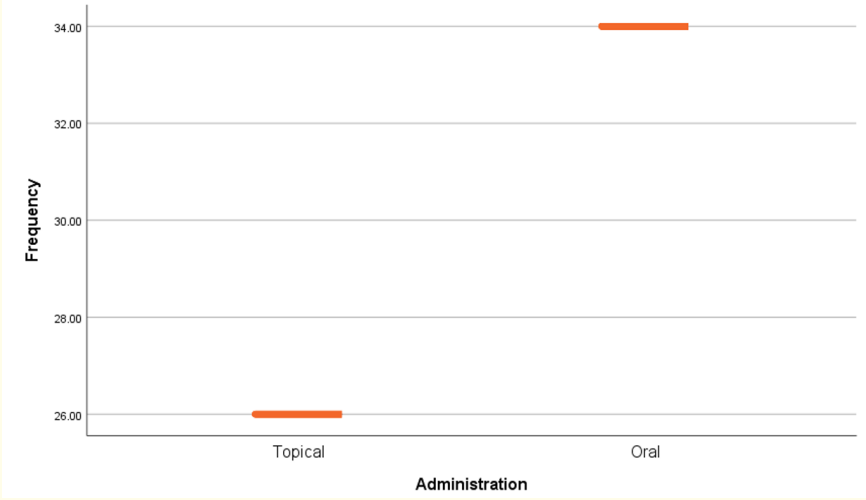

Figure 6: *Route of administration of medicinal plants used in the treatment of fungal infections.*

Discussion

Niger State is blessed with abundant of medicinal plants that can be used in the treatment of numerous ailments. The current antifungal drugs resistance issues, its advert effects and the high cost of the drugs can be reduced or eliminated through integration of medicinal plants usage. However, the current study was to examine the active medicinal plants used against fungal infections in Niger State, North-Central, Nigeria. An ethnobotanical survey has been conducted in all Local Government Area of Niger State. A total of 157 herbalists, healers, spiritualists, farmers, hunters, elders, students and other individuals having knowledge of medicinal plants took part in this study. There were 101 (64.33%) males and 56 (35.67%) females. This finding is consistent with the studies of Anup., *et al*. [13] and Gbadamosi and Egunyomi [7]. And contrarily disagreed with the findings of Shosan., *et al*. [14] and Alfa., *et al*. [3] because of the large majority of respondents were females in their studies. The predominance of the participants are around 31 to 40 years old, this is because people of these ages are strong, mature and responsible to endeavor themselves for the progress and development of the community. As such they can administer the knowledge of medicinal plants used in the treatment of ailments in the community. The study showed that the majority of interviewees are literate (approximately 60%). The percentage frequency of medicinal plants used against fungal diseases was inversely related to their education background of the interviewed population (tertiary: 07.64%, Secondary: 24.20%, Basic: 28.03% and illiterate: 40.13%). Loss of valuable of medicinal plants knowledge influenced the literate people who studied to be more concerned towards the modern medicines. A total of 34 medicinal plant species belonging to 22 families were evaluated as new bioactive agents for the treatment of fungal infections (Table 2). This shows the significant abundance and diversity of medicinal plant species used against fungal, viral, bacterial, parasitic and other ailments in the study area. Some studies has showed similar biodiversity findings such as Alfa., *et al*. [3] has reported 37 medicinal plant species distributed in 20 families as being used against Aphtae, Tinea and Herpes vine, Otang., *et al*. [15] in 2012 also evaluated 32 genera, 26 families and 33 medicinal plant species used against opportunistic fungal infections in immunocompromised patients in South Africa. Sheher., *et al*. [16] in 2013 has reported 50 medicinal plants belonging to 33 families used

against skin infections in Pakistan. The most predominant family was, Fabaceae (9 species) followed by Malvaceae with 3 species and Proaceae; Amaryllidaceae with 2 species each. Other families have one species (Figure 3). However, the bioactive agents and their modes of action of these medicinal plants were not evaluated apparently due to long period and frequent utilization of plant families which contain bioactive secondary metabolites that act against fungal ailments. Some studies shows that Caesalpinaceae and Fabaceae are containing tannins, alkaloids, saponosides and anthocyanin [17]. The family Combretaceae is highly rich in polyphenols, Tannin and alkaloids [18]. All these agents are commonly known for their antifungal activities. Antifungal agents of the Caesalpinaceae and Fabaceae families have been evaluated to contain flavonoids which possess anti-oxidant properties that prevent tissue impairment related with the onset of skin infections and free radical generation. These medicinal plant families are enriched with secondary metabolite such as terpenoids, it maintain and enhance the immunity of the individual. The most cited medicinal plants include *Ficus sur*, *Gardenia ternifolia*, *Pterocarpus santalinoides*, *Mangifera indica*, *Erythrina senegalensis*, *Allium cepa aggregatum*, *Allium sativum*, *Amaranthus spinosus*, *Citrus aurantiifolia*, *Parkia biglobosa*, *Aloe lateritia*, *Kigelia Africana*, *Croton lobatus*, *Senna italic*, *Azadirachta indica*, *Waltheria indica*, *Sterculia setigera*, *Eleusine indica*, *Nymphaea lotus*, *Tamarindus indica*, *Byrocarpus coccineus*, *Indigofera spicata*, *Imperata cylindrical*, *Parkia biglobosa*, *Vitellaria paradoxa*, *Crateva adansonii* and has shown effectiveness against fungal, viral, parasitic and bacterial infections which is agreed to this study. In this study, different parts of medicinal plants has shown effectiveness against numerous fungal infections. Among the different plant parts, leaves are the major plant parts used for the treatment of fungal infections with the highest percentage frequency of 25.47% followed by roots (22.64%) and stem bark (16.04%) respectively. This results agreed with the findings of Telefo., *et al*. [19] and Gbadamosi and Egunyomi [7], that, the medicinal plant leaves are significant constituents in many herbal preparation against fungal diseases. Leaves might contain photosynthates content which could be responsible for distorting fungal pathogens as the main photosynthetic organs [13]. However, using leaves content in traditional medicine is easy compared to other parts of medicinal plant [19]. Digging out roots and stem bark could leads to total destruction of the medicinal plants and putting the species in a vulnerable condition, therefore, using leaves might conserves the plant species for future use [20]. Most preparations are made with clean water as a solvent and the decoction is generally the method of choice (22.55%) followed by boiling (19.61%) and poultice (14.71%) respectively. The results of the preference of this mode of preparation is consistent with the findings of Alfa., *et al*. [3] and Abouri., *et al* [21]. The most popularly route of administration is oral (56.67%) followed by topical (43.33%) and that agrees with the findings of Gbadamosi and Egunyomi [7].

Conclusion

This study can be used as a remedies against serious burden of antifungal resistance, advert effects and high cost of antifungal drugs if properly integrated. It added more information to the existing discoveries of the significant of medicinal plants and its usefulness against fungal, bacterial, viral and parasitic infections among the residents of Niger State. All medicinal plants mentioned in this study need to be examined through a toxicological, pharmacological and phytochemical investigation to discover their bioactive agents. And suggest further studies on safe and appropriate method of preparation and route of administration of these medicinal plants use in traditional medicine against microbial infections.

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Conflicts of Interest

Authors declare no conflict of interest.

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