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Ethnobiological survey of traditional medicine practices in Oyo State

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A comprehensive study with the aim of documenting traditional medicinal practices was carried out between November 2008 and January 2012 in 16 locations across Oyo State. Semi-structured questionnaires and open-ended informal interviews were administered during series of visits to a total of 31 respondents. A total of 115 traditional medicinal practices were described for the treatment of 32 different ailments. Ninety-one plants, 18 animals and 26 other ingredients were described being used in the preparations of the described traditional remedies. The 88 identified plants spread across 50 plant families; with Papilionaceae having the highest (7) number of species representatives. Baby care had the highest number (14) of herbal remedies. The mode of preparations and administration of the herbal treatments varied widely. Leaf was the most frequently used plant part in the herbal remedies described in this study. This study further strengthened the relationship between indigenous knowledge, ethnomedicinal practices and pharmacology.

Keyword: Ethnomedicine, Traditional Medicinal Practices, Herbal Recipes, Oyo State, Nigeria.

1. Introduction

The African continent has a long history with the use of plants for medicinal purposes^[1]. Traditional medicine has been the only source of health care in Nigeria in historical times. Orthodox medicine was not formally introduced into Nigeria until 1860s when Sacred Heart Hospital was established by the Roman Catholic Missionaries in Abeokuta^[2]. By 1870s, the British Colonial Government started providing formal medical services with the construction of hospitals and clinics in Lagos, Calabar and other coastal trading centers. The succeeding years witnessed the steady expansion of medical facilities to more Nigerians, which by 1979, there were five hundred and sixty-two General Hospitals, sixteen maternity hospitals, eleven Armed Forces hospitals, six teaching hospitals and three prison hospitals, altogether accounting for forty-four thousand, six hundred hospital

beds. These are in addition to nine hundred and thirty maternity homes, two thousand, seven hundred and forty general clinics, about six hundred General health centres, and one thousand, two hundred and forty maternal health centres^[2]. The medical facilities were owned by Federal, State and Local Governments, as well as private owners. However, there were great disparities and geographical misdistribution of medical facilities among various regions of Nigeria and a high ratio of physician-population ratio, and this culminated in long hours of waiting in hospitals, up to 8 hours of waiting^[3] and feeling of superiority and uncaring attitude of medical staff in many medical centres, even till date. Despite the proliferation of medical centres, in the 1980s, it was between eight hundred and one thousand and three hundred people per hospital beds in Southwest Nigeria, two thousand and two hundred people per bed in Middle belt,

three thousand and eight hundred people per bed in the north and one thousand and three hundred people per bed in the East ^[2]. Most rural areas were starved of medical facilities as physicians are unwilling to live and work in rural areas. This was confirmed by Sorungbe ^[4] that, as at then, only 39% of the rural communities had been accessed. Till date, most rural medical centres have no medical doctors and those stationed there visit the hospitals only once or twice a week for medical consultations by patients. Furthermore, expensive medical equipment could not be purchased and the few available ones had no expertise operators. Metz ^[2] noted that poor Government maintenance and frequent regime changes led to the deterioration of Government hospitals, while medical fees were very expensive for the common man to afford.

Despite the proliferation of medical centres, as at 1985, a WHO survey reported that more than 75% of Nigerians still depended on medicinal plants for primary health care ^[5]. By 1987, the Government launched Primary Health Care (PHC) Policy with the view of spreading medical facilities and children immunization to rural areas. Frequent outbreaks of epidemics in rural areas across the country, with reported deaths were an indication that medical facilities and personnel are still lacking to meet the demands of the ever-increasing Nigerian population today. In some African countries, up to 90% of the population relies on medicinal plants as a source of drugs ^[6,7]. Diallo and Paulsen ^[8] reported that 80% of the population in Mali use traditional medicine as their only type of medicine. The yearly herbal medicine trade fair in Nigeria and increasing publicity and patronage this attracts, irrespective of the social, educative or religious background of the people, are indicative of acceptance of herbal medical practice ^[9].

Documentation of traditional therapeutic know-how could lead to the discovery of new drugs as well as contribute to the conservation, sustainable management and use of plant resources, therefore, it is very crucial that ethnobiological surveys be carried out for the preservation of these indigenous knowledge. However, knowledge on the use of medicinal plants is

enormous but if this is not rapidly researched and recorded, indications is that it will be lost with succeeding generations ^[7]. In order to preserve traditional medicinal knowledge, it is necessary that inventories of plants with therapeutic value are carried out, and the knowledge related to their use documented in systematic studies. These studies can have other values too for society besides conserving traditional knowledge, for they can help to identify plants with market potential that can generate incomes for local communities. Again, ethnobiological surveys provide the rationale for selection and scientific investigation of medicinal plants and animals, since some of these indigenous remedies have successfully been used by significant numbers of people over extended periods of time ^[10]. Documentation of this vast indigenous traditional medicine knowledge is important for the preserving indigenous knowledge, cultural values and knowledge of medicinal plants, and is the bedrock for further pharmacological research, bioprospecting and drug discovery ^[11]. Therefore, this study focused on surveying and documenting the traditional medicinal practices used for managing different ailments in Oyo State, Southwest Nigeria.

2. Methodology

2.1. Study Area

Oyo state was established in 1976 from the defunct Western Region, with the total estimated population of 6,617,720 people ^[12] mainly Yoruba people. The land area is 28,454km². The indigenes are mainly Oyo, Ibadan, Oke-Ogun and Ibarapa peoples, and notable cities include Ibadan (the State capital), Oyo, Ogbomosho, Saki, Okeho, Iseyin, Kishi, Eruwa and many others. The state is divided into thirty-three Local Government areas. Greater parts of the state fall within Guinea savanna, while Ibadan is classified as a derived savannah. The southern fringes of the state are still being dominated by tracts of rainforests. Oyo state is located in Southwest region of Nigeria (Figures 1 and 2) between latitude 8° 00 N and longitude 4° 00 E. The main indigenous occupation of the people is farming, while arts and crafts are popular in Oyo town.



Fig 1: Map of Nigeria showing Oyo State

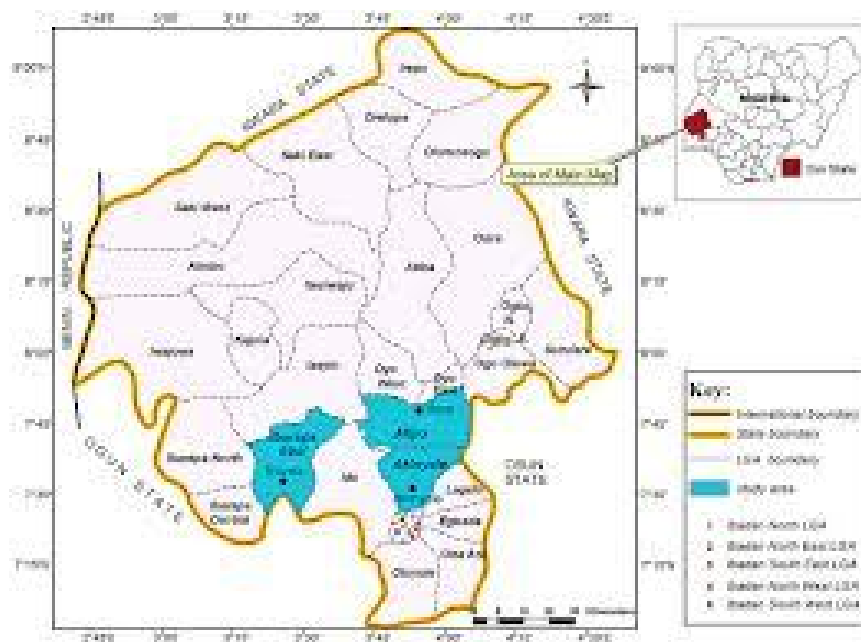


Fig 2: Map of Oyo State, Nigeria

The areas visited during this study include Saki (Saki West LGA), Sepeteri (Saki East LGA), Apata (Ido LGA), Oyo (Atiba LGA), Ikoyi (Orire LGA), Ayetoro (Kajola LGA), Karimu village, Abule Tapa (Iwajowa LGA), Idi-Ayunre, Buso-gboro (Oluyole), Iseyin (Iseyin LGA), Fiditi (Afijio LGA), Ebedi and Modeke (Oorelope LGA), Ayepe (Oriire LGA), Bode (Ibadan South East LGA) and Idere (Ibarapa Central LGA).

2.2. Ethnobiological Survey

The main data sources consisted of a series of semi – structured questionnaires and informal interviews administered on local herb sellers, hunters, herbalists and other groups of people rich in traditional medicine knowledge. The administration of questionnaires and informal interviews were done for three years, between November 2008 and January 2012. This involved repeated visits to the selected respondents in the areas visited. The information gathered was sorted, the local names given were interpreted to their respective biological names using the publication by Gbile and Soladoye^[13] and other relevant previously published research papers.

3. Results

The result is a compendium of traditional medicine practice in Oyo state compiled over a period of three years.

3.1. Respondents' Identity

Table 1 indicated that a total of thirty-one people were interviewed for traditional medicine practice in Oyo state. Furthermore, thirteen of them were males while the remaining eighteen were females. All the herb sellers interviewed were women and in addition, majority of the respondents were within the age range of forty and fifty (twenty-one), only five within fifty and sixty, only two falls within the range of sixty and seventy, and another three within the range of above seventy. Only one of the respondents was a University graduate, the rest were herb seller (sixteen), herbalist (ten), herb collectors (two), civil servant (one), hunter (one) and one retired civil servant. Aside the University graduate, majority were illiterates (eighteen), primary school leaver or drop-outs (ten) and only two secondary school leavers. Furthermore all, except the retired civil servant, claimed that they inherited their vocation from their parents, and possibly their ethnomedicinal knowledge as well. It should be noted that all the respondents were Yoruba speaking people of Oyo state.

Table 1: Source of Ethnomedicinal Information

S/N	Demographic information	Frequency (n=31)	Percentage
1	Gender		
	- Male	13	41.9
	- Female	18	58.1
2	Age category (years)		
	- Below 30	0	0
	- 31-40	0	0
	- 41-50	21	67.7
	- 51-60	5	16.1
	- 61-70	2	6.5
	- Above 70	3	9.7
3	Highest level of education		
	- No formal	18	58.1
	- Primary	10	32.3
	- Secondary	2	6.4
	- Diploma	0	0
	- Degree	1	3.2
4	Main Occupation		
	- Hunter	1	3.2
	- Civil servant/retired	2	6.4
		2	51.6

- Herb seller	16	6.4
- Herb collector	2	32.3
- Herbalist/Priest/Priestess	10	

3.2. Ethnobiological Survey

A total of 115 herbal remedies were described for the treatment of 32 different ailments in this study (Table 2). The ailments include cold/catarrrh, asthma, cough, tuberculosis, toothache, ear defect, mouth infections, river blindness, convulsions/child convulsions, Cholera, Baby care, Child theft, Beriberi, Weight reduction/obesity, Kidney/renal problems, Alcohol hangover, Poison antidote, Cancer, Rheumatism, Back to sender charm, Good market prayer, Prayer for breakthrough, Water purification, Snake repellent, Adding more weight, Liver cleansing, Arthritis, Back pain, General love charm/ lack of saving, Prevention against all ailments and Energy boost with baby illness having fourteen different kind of treatment (Table 2). Furthermore, 91 plants species, including 3 unidentified plants, (Table 3), 18 animals/animal parts (Table 4) and 26 other ingredients (Table 5) were mentioned in the herbal remedies described.

Baby care had the highest number ^[14] of herbal remedies, followed by cough ^[10] and asthma ^[9]. The mode of administration of the herbal treatments varied from oral administration (drinking, chewing, licking and eating), making incisions, bathing, spraying/spreading to topical application (Table 2); while the method of preparation varied widely. The methods encountered in this study include infusion, decoction, maceration, spraying, squeezing, burning/charring, soaking (in water), grinding/pounding, drying and pulverization into powder and many other variant methods (Table 2). Leaf was the most frequently used plant part in the herbal remedies described in this study. In addition, the 88 identified plants spread across 50 plant families, with Papilionaceae having the highest number ^[7] of species representatives, followed by Annonaceae and Rutaceae, each with 5 species representatives (Table 3).

Table 2: Ethnobiological survey of traditional medicinal treatments for piles and diabetes mellitus in Oyo State, Nigeria

S/N	Disease	Plants, parts used, preparation and dosage
1	Convulsions/child convulsions	Soak a smell rat, <i>Allium ascalonicum</i> bulbs, fresh <i>Nicotiana tabacum</i> leaves and dry (died) chameleon with <i>Crinum jagus</i> leaf juice for twenty-four hours. Adult should take two spoons and children should take one spoon before meal three times daily to stop convulsions
		Cook palm kernel shell, <i>Adansonia digitata</i> bark, <i>Xylopia aethiopica</i> bark, <i>Tetrapleura tetraptera</i> bark, <i>Lonchocarpus cyanescens</i> root, <i>Annona senegalensis</i> root and <i>Allium ascalonicum</i> bulb. The concoction is given to the child in little quantity daily. Part of it is used to bathe the child from neck downwards to treat child convulsions
		Collect African civet meat, dead shrewd, <i>Allium ascalonicum</i> bulb, fresh <i>Nicotiana tabacum</i> fruit, dry chameleon are all soaked in leaf juice from <i>Crinum jagus</i> or <i>Crinum glaucum</i> . Adult patient should take two tablespoons full dose while children should take a tablespoon full dose to treat child convulsions
		Cow's urine and <i>Allium ascalonicum</i> bulbs are mixed together in a bottle till next day. A baby to toddler takes one teaspoon full, older child/adult takes one spoonful three times daily to treat child convulsions
		Mix grinded <i>Allium cepa</i> bulbs, <i>Allium sativum</i> rhizomes and <i>Zingiber officinale</i> rhizomes together with palm oil. Administer one tablespoon of the mixture orally for the child and rub one tablespoon on the child's face, stomach and leg for immediate stop of child convulsion
2	Cholera	Mix <i>Citrus aurantifolia</i> fruit juice and schnapps (distilleries) of same quantity and squeeze <i>Vernonia amygdalina</i> leaves with it and filter. Add cold pap and

		<p>small palm oil and take four spoons every four hours to treat cholera</p> <p><i>Sarcocephalus latifolius</i> root bark is grinded till it becomes homogenised, mix with a glass cup full of <i>Citrus aurantifolia</i> fruit juice in a bottle, and take half a glass cup full in the morning and night to treat cholera</p>
3	Baby care	Blend fruit peel of <i>Musa nana</i> (<i>omimi</i>) with native soap and bath the child with it to enhance teething in babies without sickness
		Blend closed <i>Angraecum distichum</i> leaves (nine for boy and seven for girl), <i>Xylopia quintasii</i> fruits (nine for boy and seven for girl) with native soap. Bath the child with this soap right from three months old to enhance teething in babies without sickness
		Blend bat head and <i>Alternanthera sessilis</i> leaves with native soap and bathe the child's head with it to enhance teething in babies without sickness
		Grind fruits of <i>Combretum racemosum</i> with native soap. Bathe the baby with the mixture twice daily to enhance teething in babies without sickness
		Boil parrot head, tree bear meat, <i>Angraecum distichum</i> leaves together with water and give the child to drink as a medication to open the baby's voice
		A mixture of the leaf extracts of <i>Bryophyllum pinnatum</i> and <i>Clerodendrum capitatum</i> is inhaled by the baby to stop difficulty in breathing in babies
		<i>Bryophyllum pinnatum</i> leaf juice is applied on baby's navel for quick healing
		Burn bush fowl legs, deer legs, one Egyptian plover bird, cat legs together and mix it with native soap for bathing the child to enhance the child walking
		Pound the root of male <i>Carica papaya</i> tree with native soap. Always wash the child's leg kneel downward to enhance child walking
		Boil <i>Tetrapleura tetraptera</i> bark, <i>Boscia angustifolia</i> bark, <i>Spondias mombin</i> bark, <i>Allium ascalonicum</i> bulb and <i>Xylopia aethiopica</i> seeds with water and give the baby as a new born baby medication
		Boil leaves of <i>Momordica charantia</i> , <i>Citrus aurantifolia</i> root, <i>Xylopia quintasii</i> leaves with water and administer to the child to treat baby's navel pains
		Extract <i>Carica papaya</i> fruit juice and mix with water and administer in small quantity (one tablespoon twice daily after meal) to the baby to treat indigestion
		Mix honey with juice from seven <i>Citrus aurantifolia</i> fruits and administer to the child of not less than six months old. Give the baby one spoon twice daily after meal to treat indigestion
Administer <i>Cocos nucifera</i> (coconut) water to a child to stop frequent stooling, diarrhea and dysentery. Six months baby and below to take two spoonfuls of the coconut water every six hours; child above six months up to one year old to take four spoonfuls every six hours, while children between one and two years old to take one-quarter of a glass cup, while children above two years to take half a glass cup of the coconut water		
4	Child theft	Blend airagba leaves (nine leaves for boy, seven leaves for girl), with native soap, and use the early morning urine of the mother to mix them well. Bath the child with it for seven days with new local sponge to stop child theft
		Dry small part of the child faeces and blend it with <i>Vigna unguiculata</i> seeds (nine for boy, seven for girls), and always take it with cold pap for twenty-one days to stop child theft
5	Beri-beri	Eat some quantity of <i>Zingiber officinale</i> rhizomes with <i>Aframomum melegueta</i> rhizomes together raw.
6	Weight reduction/ Obesity	Mix same quantity of <i>Citrus aurantifolia</i> fruit juice and honey together with small quantity of water. Take half a glass cup three times daily, with regular exercises.
		Collect large quantity of <i>Corchorus olitorius</i> leaves, spread till they are dry and pulverize to powdery form. Put a spoonful in a cup of water, leave for fifteen mins and drink
		Boil <i>Zea mays</i> chaff with its silk, <i>Citrus aurantifolia</i> fruit juice, <i>Oxytenanthera abyssinica</i> leaves with water. Drink a glass cup every morning before breakfast to treat obesity

		Make a tea infusion of <i>Stellaria media</i> leaves and take a glass cup of the herbal tea three times a day.
		Take one <i>Citrus aurantifolia</i> fruit juice every morning before food to burn excessive fat in the body
7	Kidney/renal problems	Boil <i>Phaseolus vulgaris</i> (red kidney bean) pod to make tea and drink to treat kidney problems
		Boil <i>Sida acuta</i> root and drink to treat kidney problems
		Eat roasted <i>Arachis hypogaea</i> nuts with the seed coat to treat kidney problems
		Boil and eat <i>Ipomoea batatas</i> tubers with the skin to treat kidney problems
		Collect and chew 50 leaves of <i>Launaea taraxacifolia</i> raw to treat difficulty in urination
		Cook <i>Calotropis procera</i> leaf and drink for oedema/dropsy
8	Alcohol hangover	Extract ripe <i>Carica papaya</i> juice and <i>Aloe vera</i> juice in the same proportion and mix them. Take one small cup every day to manage alcohol hangover
9	Poison antidote	Grind six <i>Garcinia kola</i> fruits; add it to four spoons of honey and small quantity of palm oil. Mix with one tin of milk. Drink everything instantly as snake poison antidote
		Crush <i>Moringa oleifera</i> leaves and apply extract to the affected part bitten by snake
		Pound <i>Petiveria alliacea</i> root and mix with <i>Citrus limon</i> fruit juice and apply to the snake bitten body part.
		Grind seven <i>Garcinia kola</i> fruits and pour in a bottle, add palm kernel oil till it reaches half of bottle, add five spoonfuls of honey, add a tin of milk and mix. The victim to drink the mixture at once. The victim is expected to vomit the poison
10	Cancer	Mix three spoons of honey, little potash, <i>Citrus aurantifolia</i> fruit juice with native soap. Scrape the bumps with razor and apply the solution till it dries off. This is used to treat bumps/skull cancer
		<i>Catharanthus roseus</i> leaf extract is used against different kinds of cancer: skin cancer, leukaemia and breast cancer among others.
11	Rheumatism	Blend four red <i>Cola nitida</i> nuts, four <i>Buchholzia coriacea</i> fruits, four <i>Zingiber officinale</i> rhizomes, two <i>Aframomum melegueta</i> rhizomes, few <i>Piper guineense</i> fruits, <i>Ocimum guineensis</i> leaves, five <i>Garcinia kola</i> nuts together and soak with a bottle of <i>Citrus aurantifolia</i> fruit juice. Adult should take two spoons while children should take one spoon in the morning and night after meal to treat rheumatism
		Blend the bone of dog to powder and take one spoon with hot pap for two weeks to treat rheumatism
		Macerate <i>Jatropha curcas</i> stem and rub on the affected parts to treat rheumatism
		Collect sap from <i>Milicia excelsa</i> tree bark and rub on legs affected by rheumatism.
		<i>Paullinia pinnata</i> leaf infusion is taken orally once daily for rheumatism
		Collect and cut in pieces <i>Baphia nitida</i> roots in a four litres' container, add <i>Zingiber officinale</i> rhizomes, <i>Allium sativum</i> rhizomes, and two bottles of gin and allow fermenting for two days. Take one-quarter of a cup three times daily to treat rheumatic pains
		Soak ten half cut <i>Citrus aurantifolia</i> fruits with one litre of water or soda water. Take half of a cup three times daily to treat rheumatic pains
12	Back to sender charm	Before talking to anyone in the morning, take your early morning urine. It sends back to the sender any evil planned or done against the person.
13	Good market prayer	Blend <i>Ipomea batatas</i> leaves and <i>Zea mays</i> grain chaff (eri) together and mix it with native soap. Bath with it using local sponge in the morning. It brings more customers to your shop to buy your wares for that day/week.

14	Prayer for breakthrough	Remove the complete intestines of male bush rat and burn it with one <i>Aframomum melegueta</i> rhizomes. Mix it with pure honey. Lick it every morning before going out. It ensures that you have success in everything you do
15	Water purification	Powdered seeds of <i>Moringa oleifera</i> added to water shake vigorously and leave to settle for two hours. Decant clean water.
16	Snake repellent	Slice <i>Garcinia kola</i> fruits and spread it in the place, snakes run away from the place
		Plant <i>Ocimum gratissimum</i> in the place, as the scent drives snakes away
		Plant <i>Petiveria alliacea</i> in the place, as its scent drives snakes away
17	Adding more weight	Collect four bottles of pure honey, <i>Ananas comosus</i> fruit juice, matured <i>Musa sapientum</i> fruits. Pound the plantain; mix with four raw eggs of domestic fowl, honey and <i>Ananas comosus</i> fruit juice. Take half a glass cup after dinner every night to add more weight
18	Liver cleansing	Eat <i>Garcinia kola</i> fruits raw for liver cleansing
19	Arthritis	Boil <i>Sida acuta</i> leaves and drink to treat arthritis
		Rub <i>Petiveria alliacea</i> leaf juice on affected part to treat arthritis
		Collect and cut in pieces <i>Baphia nitida</i> roots in a four litres' container. Add <i>Zingiber officinale</i> rhizomes, <i>Allium sativum</i> rhizomes, two bottles of gin and allow to ferment for two days. Take one-quarter of a cup three times daily to treat arthritis
		Soak ten half cut <i>Citrus aurantifolia</i> fruits with one litre of water or soda water. Take half of a cup dose three times daily to treat arthritis
20	Back pain	Gun powder, two <i>Aframomum melegueta</i> rhizomes, two white ant, two ant lion are all grinded in a mortar and pestle and used to make nine incision marks on a man and seven on a woman on the back
21	General love charm/lack of savings	Burn three parrot tails, three skins, three <i>Aframomum melegueta</i> rhizomes together. Use part of it to make incision round your waist and mix the rest with native soap for bathing to help with having financial savings or to make someone fall in love with you.
22	Prevention against all ailments	Put complete intestines of a white cock, white male duck and male big rat in a white covered container. Mix some of the blood of the three and add it to your bathing water. Soak the intestines with palm kernel oil and add <i>Enantia chlorantha</i> bark. Take two spoons every three days as prevention against diseases
23	“Ogun ti owo and ese ba nku kiri”	<i>Calliandra haematocephala</i> bark, gun powder, red alum, one <i>Aframomum melegueta</i> rhizome are all grinded together and mixed with palm kernel oil. Rub it on the arms and legs every morning and night
24	Energy booster	Add 1 teaspoon of salt to a bottle of 7up or Sprite soft drink. Take half a glass cup three times daily for one week for strength and energy.
25	Cold, catarrh	Boil fresh <i>Ocimum gratissimum</i> and <i>Cymbopogon citratus</i> leaves in a pot for thirty minutes. Place your head on the pot to inhale the hot steam till you sweat very well once daily till the cold stops.
		Soak sliced <i>Garcinia kola</i> nuts, sliced <i>Gongronema latifolium</i> root and menthol with the same quantity of pure honey and <i>Citrus aurantifolia</i> fruit juice. Use two spoons three times daily after meal to treat catarrh
		Infusion of <i>Abrus precatorius</i> leaves is taken to treat catarrh
		Dry and grind <i>Ocimum gratissimum</i> leaves and inhale it to treat catarrh
26	Asthma	Chew <i>Zingiber officinale</i> rhizomes to treat congested nose
		Mix 160 ml each of honey and snail fluid together. Take 3 spoons three times daily after meal.
26	Asthma	Roots of <i>Olox subscorpoidea</i> and <i>Securidaca longepedunculata</i> , stems of <i>Euphorbia dieghonii</i> and <i>Euphorbia laterifolia</i> , <i>Crinum jagus</i> bulb, <i>Tetrapleura tetraptera</i> fruit (the edges of the <i>Tetrapleura tetraptera</i> fruits are used) and <i>Allium ascalonicum</i> leaf are all washed and cut into pieces and soaked for three days in water. A small glass cup full are taken by adults and a small teaspoon for children daily to treat asthma

		<p>Cold infusion of <i>Harungana madagascariensis</i>, <i>Bombax buonopozense</i> and <i>Entandrophragma angolense</i> barks, <i>Anthocleista djalonensis</i> bark/stem, stem of <i>Vernonia tenoreana</i> and <i>Curculige pilosa</i>, <i>Ocimum gratissimum</i> shoot and bulbs of <i>Crinum jagus</i> and <i>Allium ascalonicum</i>. Children to take one spoon of the extract, while adults should take two tablespoon full of the extract early in the morning everyday to treat asthma</p> <p>Collect large quantity of white snail eyes, grind with <i>Garcinia kola</i> fruit and mix with a bottle of honey. Adult takes three table spoonful three times daily, children to take half one tablespoon full dose three times daily to treat asthma</p> <p>Chew <i>Abrus precatorius</i> leaves to treat asthma</p> <p>Decoction of <i>Allium sativum</i> bulb is taken orally to treat asthma</p> <p>Root infusion of <i>Garcinia kola</i> is taken with little salt is taken for asthma</p> <p>Root bark of <i>Garcinia kola</i> is taken orally after food to treat asthma</p> <p>Chew <i>Zingiber officinale</i> rhizomes to treat asthma</p>
27	Cough	<p>Boil <i>Piper guineense</i> bark, <i>Amaranthus spinosus</i> tree bark, <i>Abrus precatorius</i> leaves, small sugar together with <i>Citrus aurantifolia</i> fruit juice for twenty minutes. Adult: two spoons twice daily. Children: one spoon twice daily after meal to treat cough</p> <p>Squeeze and drink <i>Bryophyllum pinnatum</i> leaf juice to treat cough and heart burn</p> <p>Soak <i>Spondia mombin</i> bark, <i>Amaranthus spinosus</i> bark, <i>Abrus precatorius</i> leaves and 4 sugar cubes in water for twenty-four hours. Take one tablespoon full dose daily for children and two tablespoons full dose for adults to treat cough</p> <p>Soak honey, <i>Fofookun</i>, <i>Garcinia kola</i> nuts, <i>Bridelia ferruginea</i> bark in <i>Citrus aurantifolia</i> fruit juice. Administer one tablespoon three times daily for children and two tablespoons for adults three times daily to treat cough</p> <p>Decoction of <i>Abrus precatorius</i> seeds is taken to treat cough</p> <p><i>Bryophyllum pinnatum</i> leaf is passed over naked fire for 1 minute and the pulp squeezed out is taken orally to treat cough</p> <p>Chew and swallow matured stem of <i>Costus afer</i> to treat cough</p> <p>Eat <i>Garcinia kola</i> seeds to treat cough</p> <p>Eat <i>Zingiber officinale</i> rhizomes to treat cough</p> <p>Grind ten <i>Garcinia kola</i> fruits into powder and mix with honey to form syrup. Adults to take three teaspoons three times daily, while children to take one teaspoon three times daily to treat cough</p>
28	Tuberculosis	<p>Blend the seed of unripe <i>Carica papaya</i> and <i>Allium sativum</i> rhizomes together, and put it inside a bottle of <i>Citrus aurantifolia</i> fruit juice and add a spoon of salt, and leave for a day. Take two spoons three times a day after meal to treat tuberculosis</p> <p>Blend the inner seed of unripe <i>Carica papaya</i> and extract the juice. Take two spoons three times daily after meal to treat tuberculosis</p> <p><i>Kohunkoho</i> root, <i>ajagi</i> root and <i>Calliandra haematocephala</i> root are grinded together, then add alum and add a bottle of honey. Lick it little by little to treat tuberculosis</p> <p>Chew <i>Carica papaya</i> seeds to treat tuberculosis</p> <p>Chew a handful of <i>Carica papaya</i> seeds and then eat plenty of <i>Citrus sinensis</i> fruits, <i>Citrus paradisi</i> fruit and <i>Carica papaya</i> fruit before meal. Chew one <i>Allium sativum</i> rhizome raw before going to bed to treat tuberculosis</p>
29	Tooth ache	<p>Boil <i>Zanthoxylum zanthoxyloides</i> root, <i>Nicotiana tabacum</i> leaf powder, riverside <i>Oxythenanthera abyssinica</i> leaves, little potash together with water on fermented corn extract and wash the mouth with it always</p> <p>Blend a spoon of salt, small alum, little potash and <i>Capsicum frutescens</i> fruit and <i>Piper guineense</i> fruit together. Apply it on the teeth with cotton wool and</p>

		wash with <i>Citrus aurantifolia</i> fruit juice for 10 minutes to treat tooth ache
		Use leaf extract of <i>Cajanus cajan</i> as mouthwash to treat toothache
		Chew <i>Cymbopogon citratus</i> root to treat toothache
		<i>Psidium guajava</i> leaves are chewed to treat toothache and bleeding gum
		<i>Zingiber officinale</i> rhizomes are chewed to treat toothache
		Mix a cup full of petroleum (PMS) with salt. Soak cotton wool in the mixture and apply it on the toothache. This should be repeated four times daily to treat tooth ache
30	Ear defect	Get white and red <i>Cleome rutidosperma</i> leaves, burn with <i>Aframomum melegueta</i> rhizomes. Add it to a perfume/ointment and apply it to the ears always to treat ear ache
		Mix salt with honey and heat gently. Put little on cotton wool and apply on the ear to treat ear ache
		Warm <i>Ageratum conyzoides</i> leaves over direct fire for one minute, squeeze the leaf and extract the juice and apply it into the ear once daily to treat earache
		<i>Crinum jagus</i> leaf is heated and squeezed, and salt is added to the juice extract and dropped into the ear twice daily to treat ear ache.
		In case where the ear discharges mucus or ear itching, mix small hot water, little salt and honey; stir and put two drops in each ear at night before going to bed
31	Mouth infections	Mix equal quantity of honey with <i>Citrus aurantifolia</i> fruit juice and wash your mouth with it thrice a day
		<i>Jatropha multifida</i> sap is applied topically to treat mouth infections (yoro enu)
		Boil a bottle full of <i>Citrus aurantifolia</i> fruit juice, add grinded potash to it and pour in a bottle. After mouth washing in the morning, the patient should gargle the mouth with the mixture.
		Use <i>Cajanus cajan</i> leaf juice as mouth wash to treat mouth disease
		Use <i>Psidium guajava</i> leaf decoction to gargle the mouth to treat mouth sore and bleeding gum
		Mix honey with <i>Citrus aurantifolia</i> fruit juice and wash it three times daily to treat palate ache and tongue ache
		Boil <i>Allium cepa</i> bulbs and <i>Citrus aurantifolia</i> fruit juice, and add little salt. The patient should wash the mouth with the mixture frequently with one spoon and drink some of the mixture to treat gum ache, palate pimples, gum pimples and other throat pimples.
32	River blindness	Get <i>Tetrapluera tetraptera</i> fruit, <i>Mondia whiteii</i> leaves, fofookun, <i>Adenopus breviflorus</i> fruits, iseta, sulphur, <i>Alstonia boonei</i> root, <i>Plumbago zeylanica</i> root, <i>Uvaria afzelii</i> root, <i>Spathodea campanulata</i> root, <i>Xylopia quintasii</i> fruit, <i>Gladiolus daleni</i> bulbs, <i>Aframomum melegueta</i> rhizome, potash, <i>Capsicum frutescens</i> , <i>Grewia venusta</i> bark and “cobwebs from local kitchen” are all grinded together. To be taken once daily in the morning.

Table 3: List of plants used for the treatment of general ailments in Oyo State, Nigeria

S/N	Plant Name	Family	Local/Common name	Part used
1	<i>Abrus precatorius</i> L.	Papilionaceae	Oju ologbo, omisinmisin, rosary pea, crab's eye	Leaf, seed
2	<i>Adansonia digitata</i> Linn.	Bombacaceae	Ose, baobab	Bark
3	<i>Adenopus breviflorus</i> Benth.	Cucurbitaceae	Tagiri, ito	Fruit juice
4	<i>Aframomum melegueta</i> (Rosc.) K. Schum.	Zingiberaceae	Atare, alligator pepper	Fruit
5	<i>Ageratum conyzoides</i> L.	Asteraceae	Imi-esu, goat weed	Flower, leaf, leaf sap, whole plant
6	<i>Allium ascalonicum</i> L. Backer	Liliaceae	Alubosa elewe, Leafed onion, Shallot, wild onion	Bulb
7	<i>Allium cepa</i> L.	Liliaceae	Alubosa, onions	Bulb
8	<i>Allium sativum</i> L.	Liliaceae	Ayuu, garlic	Rhizome

9	<i>Alstonia boonei</i> De Wild	Apocynaceae	Ahun, stoolwood	Bark
10	<i>Alternanthera sessilis</i> (Linn.) R.Br.ex DC	Amaranthaceae	Dagunro, sessile joyweed	Leaf
11	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Teteregun, thorn pigweed	Bark
12	<i>Ananas comosus</i> (Linn.) Merrill.	Bromeliaceae	Ope-oyinbo, pineapple	Fruit
13	<i>Angraecum distichum</i> Lindl.	Orchidaceae	Ela, Guava baby	Leaf
14	<i>Annona senegalensis</i> Pers.	Annonaceae	Abo, African custard apple	Root, leaf
15	<i>Arachis hypogaea</i> L.	Papilionaceae	Epa, groundnut/peanut	Nut
16	<i>Baphia nitida</i> Lodd	Papilionaceae	Owiwi, Iyere osun/yeusun	Root
17	<i>Anthocleista djalonenensis</i> A. Chev.	Loganiaceae	Sapo, cabbage tree	Bark
18	<i>Bombax buonopozense</i> P. Beauv.	Bombacaceae	Ponpola, Gold Cost Bombax	Bark
19	<i>Boscia angustifolia</i> A. Rich.	Capparidaceae	Oko eran, Boscia	Bark
20	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Crassulaceae	Abamoda, resurrection plant	Leaf juice
21	<i>Buchholzia coriacea</i> Engl.	Capparaceae	Obi,-ata, Wonder kola	Fruit
22	<i>Cajanus cajan</i> (L.) Millsp.	Papilionaceae	Otili, pigeonpea	Leaf, root, seed
23	<i>Calliandra haematocephala</i> Benth.	Mimosaceae	Tude, Calliandra	Bark, root
24	<i>Calotropis procera</i> (Ait.) Ait. f.	Asclepiadaceae	Bomubomu, Sodom apple	Leaf
25	<i>Capsicum frutescens</i> L.	Solanaceae	Ata ijosi, Ata wewe, ata ibile	Fruit
26	<i>Carica papaya</i> Linn.	Caricaceae	Ibepe, pawpaw	Seed, sap, leaf, leaf extract, fruit
27	<i>Catharanthus roseus</i> Linn. G.Donn	Apocynaceae	Apabida pupa, rosy periwinkle	Leaf juice
28	<i>Citrus aurantifolia</i> (Christm.) Swingle	Rutaceae	Osan wewe, Lime fruit	Fruit, leaf
29	<i>Citrus limon</i> (L.) Burm.f	Rutaceae	Lemon	Fruit
30	<i>Citrus paradisi</i> Macfad	Rutaceae	Grape	Fruit
31	<i>Citrus sinensis</i>	Rutaceae	Osan, sweet orange	Fruit
32	<i>Cleome rutidosperma</i> DC.	Capparaceae	Ekuya, fringed spiderflower	Leaf
33	<i>Clerodendrum capitatum</i> (Willd.) Schumach	Verbenaceae	Feremomi, Glorybower	Leaf
34	<i>Cocos nucifera</i> L.	Arecaceae	Agbon, coconut tree	Coconut water
35	<i>Cola nitida</i> (Vente) Schott & Endl.	Sterculiaceae	Obi gbanja, kola	Fruit
36	<i>Combretum racemosum</i> P. Beauv	Combretaceae	Ogan-ibule, bush willow/Christmas rose	Fruit
37	<i>Corchorus olitorius</i> L.	Tiliaceae	Ewedu, Jute	Leaf
38	<i>Costus afer</i> Ker Gawl	Zingiberaceae	Ireke-omode, Twisted ginger	Root, bark, stem, rhizome
39	<i>Crinum glaucum</i> A. Chev.	Amaryllidaceae	Isumeri, crinum lily	Leaf
40	<i>Crinum jagus</i> (J. Thompson) Dandy	Amaryllidaceae	Ogede odo, poison bulb	Leaf
41	<i>Curculigo pilosa</i> Schum & Thonn.	Hypoxidaceae	Epakun, African crocus	Fruit
42	<i>Cymbopogon citratus</i> (DC.) Stapf.	Poaceae	Koriko oba, lemon grass	Leaf, root
43	<i>Enantia chlorantha</i> Oliv.	Annonaceae	Awopa, osopupa, Yaani, Doctor Igbo, African yellow wood	Root
44	<i>Entandrophragma angolense</i> (Welw.) C. DC	Meliaceae	Ijebo, Tiama	Bark
45	<i>Euphorbia dieghonii</i>	Euphorbiaceae	Oro agogo, Euphorbia	Stem
46	<i>Euphorbia laterifolia</i> Schum. and	Euphorbiaceae	Enu opiri, little cactus	Leaf

	Thonn			
47	<i>Garcinia kola</i> Heckel	Guttiferae	Orogbo, Bitter kola	Root, bark, stem bark, root bark, seeds
48	<i>Gladiolus dalenii</i> Van Geel	Iridaceae	Alubosa baka, parrot Gladiola	Bulb
49	<i>Gongronema latifolium</i> Benth.	Asclepiadaceae	Madunmaro, Utazi	Root, leaf
50	<i>Grewia venusta</i> Fresen.	Tiliaceae	Ogbolo, Raisin	Root, bark
51	<i>Harungana madagascariensis</i> Lam. ex Poir	Hypericaceae	Amuje, dragon's blood tree	Root, bark
52	<i>Ipomea batatas</i> (L.) Lamb	Convolvulaceae	Anamo, sweet potato	Leaf
53	<i>Jatropha curcas</i> L.	Euphorbiaceae	Lapalapa funfun, physic nut	Leaf, seed, root
54	<i>Jatropha multifida</i> L.	Euphorbiaceae	Ogege, coral bush	Sap
55	<i>Lonchocarpus cyanescens</i> (Schumach.) Benth	Papilionaceae	Elu, West African indigo	Root
56	<i>Launea taraxacifolia</i> (Willd.)	Asteraceae	Odundun/yanrin, wild lettuce	Leaves
57	<i>Milicia excelsa</i> (Welw.) Benth	Meliaceae	Iroko, African Teak	Sap, stone inside
58	<i>Momordica charantia</i> Linn.	Cucurbitaceae	Ejinrin-were, bitter gourd	Leaf, fruit, whole plant
59	<i>Mondia whitei</i> L.	Periplocaceae	Isirigun, Mondia	Bark, root, leaf
60	<i>Moringa oleifera</i> Lam.	Moringaceae	Ewe-igbale, horse radish tree	Leaf, seed, flower, root
61	<i>Musa nana</i> J. de Loureiro	Musaceae	Ogede wewe, omimi, banana	Fruit, sap
62	<i>Musa sapientum</i> Linn.	Musaceae	Ogede agbagba, Plantain	Fruit, sap
63	<i>Nicotiana tabacum</i> SW. Afr.	Solanaceae	Taba, tobacco plant	Leaf, fruit
64	<i>Ocimum gratissimum</i> L.	Lamiaceae	Efinrin, Basil	Leaf, scent
65	<i>Olex subscorpioidea</i> Oliv.	Olacaceae	Ifon	Root
66	<i>Oxytenanthera abyssinica</i> (A. Rich) Munro	Poaceae	Oparun, bamboo	Leaf
67	<i>Paullinia pinnata</i> L.	Sapindaceae	Kakansela, sweet gum	Leaf
68	<i>Petiveria alliacea</i> L.	Phytolacaceae	Awopa,	Root
69	<i>Phaseolus vulgaris</i> L.	Papilionaceae	Awuje, Red kidney bean	Seed
70	<i>Piper guineense</i> Schum & Thonn.	Piperaceae	Iyere, black pepper	Fruit, bark
71	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Nabiri, Inabiri, Ceylon leadwort	Root
72	<i>Psidium guajava</i> L.	Myrtaceae	Gurofa, Guava	Stem, leaf, flower
73	<i>Sarcocephalus latifolius</i> (Sm.) E.A.Bruce	Rubiaceae	Egbesi, African peach	Root
74	<i>Securidaca longepedunculata</i> Fres.	Polygalaceae	Ipeta, Violet tree	Bark, root
75	<i>Sida acuta</i> Burm. f.	Malvaceae	Osepotu, Broom weed	Root, leaf
76	<i>Spathodea campanulata</i> P. Beauv,	Bignoniaceae	Eruru/oruru, African tulip tree	Root
77	<i>Spondias mombin</i> Linn.	Anacardiaceae	Iyeye, hog plum	Bark
78	<i>Stellaria media</i> L. Vill.	Caryophyllaceae	Awede, chickweed	Leaf
79	<i>Tetrapleura tetraptera</i> (Schum & Thonn) Taub	Mimosaceae	Aidan	Bark, fruit
80	<i>Uvaria afzelii</i> Sc. Elliot	Annonaceae	Gbogbonise, cluster pear	Root, root bark
81	<i>Vernonia amygdalina</i> Del.	Asteraceae	Ewuro, bitter leaf	Leaf
82	<i>Vernonia tenoreana</i> Oliv.	Asteraceae	Ewuro oko	Stem
83	<i>Vigna unguiculata</i> (L.) Walp.	Papilionaceae	Ewa, beans	Seed
84	<i>Xylopiya aethiopica</i> (Dunal) A. Rich	Annonaceae	Eru, Ethiopian pepper	Seed, fruit, bark
85	<i>Xylopiya quintasii</i> Pierre ex Engl. & Diels	Annonaceae	Eru awonka	Fruits, seed, leaf

86	<i>Zanthoxylum zanthoxyloides</i> L. Sarg.	Rutaceae	Ata-ile, Fagara	Root, root bark
87	<i>Zea mays</i> L.	Poaceae	Agbado, maize	Chaff, processed grain chaff, silk
88	<i>Zingiber officinale</i> (Roscoe)	Zingiberaceae	Ata-ile, ginger	rhizomes
89	Unidentified		Ajagi	Root
90	Unidentified		Airagba	Leaf
91	Unidentified		Kohunkoho	Root

Table 4: The animal encountered during this survey

S/N	Biological name	Local/common name	Part used
1	<i>Archatina archatina</i>	Snail	Whole body, fluid, eyes
2	<i>Rattus fuscipes</i>	Male bush rat	Intestine
3	<i>Civettictis civetta</i>	Iseta/eeta, African civet cat	Whole body
4	<i>Bos Taurus</i>	Cow	Urine
5	<i>Poicephalus gulielmi</i>	Iko ode, Red parrot/sacred parrot	Feather
6	<i>Phascolarctos cinereus</i>	Owawa, tree bear	Meat
7	<i>Guttera pucherani</i>	Aparo, bushfowl	Head, legs
8	<i>Odocoileus virginianus</i>	White-tailed deer	Legs
9	<i>Felis catus</i>	Ologbo, cat	Legs
10	<i>Pluvianus aegyptius</i>	Oge, Egyptian plover bird	Whole body
11	<i>Canis lupus</i>	Aja, Dog	Bones
12	<i>Gallus sp.</i>	Adiye, domestic fowl (hen) Akuko, cock	Eggs Intestine, blood
13	<i>Cryptotermes cavifrons</i>	Ikamudu, white ant, termites	Whole insect
14	<i>Myrmeleon sp</i>	Kuluso, ant lion	Whole insect
15	<i>Psittacus erithacus</i>	Ayekooto, African grey parrot	Feathers, crown/head, tail
16	<i>Anas platyrhynchos</i>	Pepeye, Duck/white duck	Gizzard, blood, intestines
17	<i>Chameleo cristatus</i>	Nigerian Chameleon	Whole body
18	<i>Eidolon helvum</i>	Fruit bat	Head

Table 5: List of other ingredients used for the treatment of general ailments in Oyo State, Nigeria

Pure honey	Salt
Clay pot settlement	Sugar
Fermented corn extract	Fofookun (see Figure 3)
Menthol	Cotton wool
Alum	Potash
Petroleum	Sulphur (imi ojo)
Cobweb from local kitchen	7up Soft drink
Palm kernel shell (eesan abo)	Palm oil
Gin/local gin/schnapps	Early morning urine of patient
Native soap	Mortar and pestle
Local sponge	Child's faeces
Palm Kernel oil	Soda water
Milk	Potash



Fig 3: Photograph of “Fofookun” used in the treatment of cough in Oyo State

4. Discussions

This study shows that traditional medicinal practices have been widely accepted and has a long history among the Yoruba people of Oyo State. Majority of the herbal recipes were observed to be polyherbal. Polyherbal therapy is said to be a current pharmacological principle having the advantage of producing maximum therapeutic efficacy with minimum side effects^[14]. According to Tiwari and Rao^[15], polyherbal therapies have the synergistic, potentiative, agonistic/antagonistic pharmacological agents within themselves that work together in a dynamic way to produce therapeutic efficacy with minimum side effects. Furthermore, it could be observed that water was the main solvent used for infusion, decoction, boiling, concoction and other mixtures.

The findings in this study conform to many previously conducted ethnomedicinal surveys and pharmacological studies in other parts of Nigeria. For instance, Jarrett *et al.*^[16] reported that traditional medicine is given to 40.1% of children with convulsions admitted in the University College Hospital, Ibadan, Nigeria. Traditional medicine administered included herbal preparations, incision, topical application to the eyes and burns on the feet and buttocks of affected child^[16]. Though Jarrett *et al.*^[16] reported that these herbal practices have negative effects on the victim; this confirmed the fact that there are actual herbal remedies given to children with convulsions, and where the applied herbal

remedies did not work effectively, the child is taken to the hospital for orthodox medical treatments.

Furthermore, asthma was reported to affect about 10.2% of the Nigerian population^[17]. Sonibare and Gbile^[18] reported many herbal recipes used for the treatment of asthma in Southwestern Nigeria, some of which are also encountered in this study, especially the use of *Garcinia kola*. Furthermore, Adeyeye *et al.*^[19] reported that 50.5% of asthmatic respondents use herbal treatments, in spite of their educational status and the fact that they are undergoing treatments in Asthma clinic of Lagos State University of Teaching Hospital, Lagos, Nigeria. In addition, several literatures have confirmed the effectiveness of *Moringa oleifera* seeds in the purification of water and removal of bacteria^[20, 21, 22].

Tuberculosis (TB) has been on the increase in Nigeria in recent times, with the country ranking the fifth in prevalence of TB in the world and the highest in Africa^[23]. Worse still, Girling^[24] reported that HIV patients often develop TB infections. Ogbole and Ajaiyeoba^[25] documented the use of medicinal plants in the treatment of TB in Ogun State, Nigeria; Orodho *et al.*^[26] reported the local management of TB by Traditional medicinal practitioners in Lake Victoria region of Kenya; while Nvau *et al.*^[27] documented the herbal treatment of TB in Plateau State of Nigeria. Furthermore, Borokini^[28] reported 4

herbal recipes involving the use of *Carica papaya* for the treatment of tuberculosis in Oyo State.

This study has demonstrated the uniqueness of medicinal plants in the treatment of several diseases. Many people have faith in the use of medicinal plants and herbal recipes for treating diseases, and this has roots in the indigenous beliefs and knowledge that are being passed from generation to generation in Africa and other indigenous human settlements. Furthermore, it could be observed some of the described herbal recipes used for the treatment of a particular disease in an area are also being used in other areas, as reported in literatures. This demonstrates the ubiquitous nature, dynamism and wide diffusion of ethnomedicinal knowledge among indigenous human settlements in the past ages. Furthermore, Oyo State is unique in history being the seat of power of the Yoruba people in the pre-colonial era. Furthermore, Ibadan being the State capital was established by warlords from various other parts of the Yoruba land (Southwest Nigeria), with each of them bringing their cultural beliefs and indigenous knowledge and practices which are transmitted from generation to generation. Therefore, it is most likely that many of the herbal medicinal practices reported in this study are similar to those practised in other parts of Southwest Nigeria.

5. Conclusions

This study has demonstrated the therapeutic properties of plants that can be used for the treatment of various diseases, which can be prepared and used directly. Furthermore, the study has shown that the importance of preserving indigenous knowledge, cultural values and knowledge of medicinal plants, which could act as basis of further pharmacological research, bioprospecting and drug discovery.

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