ORIGINAL ARTICLE

The use of medicinal plants to treat sexually transmitted diseases in Nigeria: Ethnomedicinal survey of Niger Delta Region

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Sexually transmitted diseases (STDs) occur throughout the world. In Nigeria, STDs are one of the leading diseases affecting a vast majority of people. The prevalence rate of these diseases is high in the Niger Delta of Nigeria, especially in Akwa Ibom and Rivers States. Majority of the population turn to traditional medical practitioners (TMPs), who are available in every community for the treatment of STDs, due to lack of access to modern health facilities and also due to the social stigma associated with the diseases. An ethnomedicinal survey was conducted on the TMPs of various communities of Akwa Ibom and Rivers States of Nigeria to obtain and document information on the medicinal plants used to treat STDs. Interviews were conducted in the local language about plant parts, ailments treated, method of preparation and dosages. The statistical analyses used were use-value, fidelity level, bar chart, and pie chart. Thirty-six plant species representing 26 families were reported by 105 TMPs as remedies for STDs including gonorrhoea and syphilis. Gonorrhoea was the most important disease treated. The medicinal plants used may serve as a source of new and effective drugs and the TMPs may serve as additional source of health manpower.

Key words: Medicinal plants, Niger Delta, Nigeria, sexually transmitted diseases

INTRODUCTION

Sexually transmitted diseases (STDs) occur all over the world, but they are highly prevalent in the developing countries.[1] In sub-Saharan Africa, they pose a reproductive health burden.[2] In Nigeria, the high incidence of STDs has been attributed to factors such as poverty, polygyny, absence of nationwide network of clinics, early age of sexual debut, lack of awareness, dense commercial sex networks and poor gender empowerment.[3-5] It has been argued that many new factors such as greater freedom for women, the increasing use of non-occlusive contraceptives, greater mobility with more frequent travel will result in a further increase in their prevalence.[6]

The Niger Delta Region (South-South) of the country was reported to be one of the regions most affected by STDs.[7] Although statistics are not available, there are indications that the rate of incidence is rapidly increasing to epidemic proportions. Since STDs are strongly associated with HIV,[8] the HIV prevalence rate is also high in the region. In 2001, the HIV prevalence among women in the region was 7.9%, the highest rate in the country. However, this rate dropped to 6.5% in 2003.[9] In the region, Akwa Ibom State, one of the component States, was reported to have the highest rate of STDs/HIV prevalence (13%) in 2001, followed by Rivers State (7.05%).[9] This prevalence rate has been on the increase ever since.

Due to some of the factors highlighted (poverty and lack of access to modern health facility), many people in Nigeria, especially those living in the rural communities (constituting 75-80% of the Nigerian population), rely on traditional medical practitioners (TMPs) for the treatment of STDs and other ailments.[6,10] The common STDs treated are gonorrhoea, syphilis, urethritis, vaginal candidiosis and Chlamydia.[6,8] Relying on TMPs for the treatment of STDs is also particularly due to the social stigma associated with the disease. People do not discuss the issue of STDs publicly, but prefer to consult TMPs who are common in every village and city and who are regarded as part of their culture. The TMPs use medicinal plants for treatment and are considered as experts in the knowledge of plants. This knowledge is fast disappearing due to lack of documentation of the knowledge and loss of forest regions and consequent endangerment of medicinal plants. This may prove disastrous because the medicinal plants utilised by the TMPs are understudied.

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Thus, ethnomedicinal survey of TMPs was carried out in some Local Government Areas of Akwa Ibom and Rivers States, known to have high prevalence rate of STDs, while the two States are the most affected States in the Niger Delta Region. The survey was carried out in order to gather and document information on the medicinal plants that have been used locally for ages to treat STDs. This may lead to discovery of new and effective drugs, and the TMPs may serve as additional sources of health manpower.

MATERIALS AND METHODS

Study Area

Akwa Ibom and Rivers States are situated in the oil-rich Niger Delta Region of Nigeria [Figure 1].

Akwa Ibom State covers a total area of 8412 km^2, comprising the entire Qua Iboe River basin and the western part of the lower Imo River basin.[11] The State lies between latitudes 4°32′ and 5°53′ North and longitudes 7°25′ and 8°25′ East. The landscape of Akwa Ibom State bears altitudes of 45-70 m.

The State is located within the forest zone of Nigeria and has a tropical rainy climate.

Akwa Ibom State comprises 31 Local Government Areas with a population of about 4 million. The State is composed mainly of the Ibibio, Eket, Annang, Oron, Andoni and Okobo ethnic groups, with the Ibibio forming the largest ethnic group in the State[12] and the fourth largest ethnic group in Nigeria.[13] Consequently, Ibibio language forms one linguistic unit of the State.

Traditionally, the chief occupations of the State are farming for the mainland indigenes, and fishing and salt production for the riverine indigenes.[11]

Rivers State is bounded on the south by the Atlantic Ocean, to the north by Imo, Abia and Anambra States, to the east by Akwa Ibom State and to the west by Bayelsa and Delta States.[14]

The State covers a total land area of 11,077 km^2, with a population of 6,689,087. The State lies within latitudes 4°45′ North and longitudes 6°50′ East.

Rivers State consists of various ethnic groups, but only four are major, namely, Ikwerre, Ekpeye, Kalabari and Ogoni. The languages of these four ethnic groups were used to name the plants gathered during the survey. These ethnic groups have existed together for centuries before the creation of the State and are currently distributed to the 23 Local Government Areas into which the State is divided.[15]

The inland part of Rivers State consists of tropical rainforest; towards the coast, the typical Niger Delta environment features many mangrove swamps.

Rivers State has one of the largest economies in Nigeria, mainly because of its crude oil. However, the traditional occupations of the people are fishing and farming.

Mode of Information Collection

Field data collection was carried out between February and October, 2010. Information on data such as local names, plant part used, therapeutic effect, diseases treated, method of preparation, and method of administration, doses and duration of treatment was gathered through semi-structured questionnaires amidst informal conversation.[16] Interviews were conducted individually with TMPs selected from six and four Local Government Areas of Akwa Ibom and Rivers States, respectively, based on the recommendation of the community heads. The number of TMPs interviewed in any particular Local Government Area is indicated in Table 1. The basic method followed was a guided field interview.[17,18] The informants were conducted during the day when the TMPs make field trips

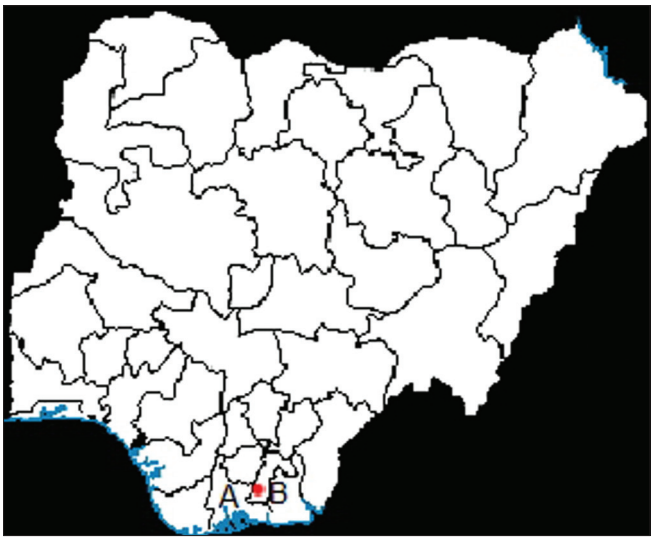

Figure 1: Map of Nigeria – A = Rivers State, B = Akwa Ibom State

Table 1: Number of traditional medical practitioners interviewed from different local government areas of Akwa Ibom and Rivers States

Local government area	Population	Number of TMPs surveyed
Akwa Ibom State		
Ibesikpo Asutan	137,101	8
Eket	172,557	11
Ikono	131,904	7
Ikot Abasi	132,023	12
Nsit Ubium	128,231	13
Uyo	309,573	9
Rivers State		
Ikwerre	189,726	11
Port Harcourt	541,115	8
Ahoada East	166,747	9
Emohua	201,901	12

TMPs – Traditional medical practitioners

to areas from where they often collect plants, while survey interviews were simultaneously conducted and information was gathered. The information obtained was noted while in the field and later cross-checked with the informants at evening meetings, which usually comprised the TMP, community elders and other interested persons. Informed consent was obtained from every informant prior to the interview. Interviews were conducted with the aid of an interpreter throughout the survey.

Medicinal plants mentioned were collected, identified and subsequently preserved and stored in the herbarium of the Department of Pharmacognosy and Natural Medicine, Faculty of Pharmacy, University of Uyo.

Biodiversity rights of the indigenes were protected. Aerial parts of the plants were collected on a sustainable basis so as to preserve the lives of the plants. Where collection of roots was involved, new plants were cultivated for sustenance of biodiversity.

Data Analysis

Use-value

The relative importance of each plant remedy was determined by calculating its use-value[19] with the formula: UV = ∑U/n, where UV is the use-value of a species, U is the number of citations of that species, and n is the number of informants. The UV is dependent purely on the importance attributed to each plant species by each informant and not on the view of the researcher.

Fidelity level

Fidelity level (FL) was also used to analyse the data. It was calculated for the most frequently reported diseases as:

$$FL\ (\%) = Np/N \times 100,$$

where Np is the number of informants who claim the use of a plant species to treat a particular disease and N is the number of informants who use the plant as a medicine to treat any given disease.[20] This method helps in selecting medicinal plants for further study.

RESULTS

A total of 36 plant species distributed among 26 families were reported as remedies for STDs by the TMPs of various communities of Akwa Ibom and Rivers States of Nigeria [Tables 1 and 2]. A total of 1808 citations were recorded for four STDs [Table 3]. The STDs included gonorrhoea, syphilis, leucorrhoea and urethritis. Euphorbiacaeae and Anacardiaceae were the most important families employed, with three plant species each [Figure 2]. Communities from Akwa Ibom State formed the major population utilising variety of plants against STDs, suggesting that the diseases are more prevalent there. One hundred and five TMPs were interviewed: 60 from six Local Government Areas of Akwa Ibom State and 45 from four Local Government Areas of Rivers State. Seventy-five of the respondents were males, while the rest were females [Table 1]. The age of the TMPs ranged from 40 to 82 years, with an average age of 52 years. The older people showed deeper knowledge of medicinal plant use.

Plant Parts Used, Method of Preparation and Administration

The most frequently reported plant part was leaves constituting 49%, followed by roots (19%), bark and whole plant (8%). Other plant parts were rarely mentioned [Table 4]. More than one single part was used only on one occasion. For instance, both leaves and bark of *Lonchophora cyanescens* (Schum. and Thonn.) Benth. were used as infusion to treat syphilis.

The most popular method of the herbal preparations used in this survey was decoction (47%). This was followed by infusion (26%) and crushing (11%) [Table 5], while the only mode of administration indicated was internal.

Importance of Ailments Treated

Thirty-six plant species were recorded to treat four different STDs [Tables 2 and 3]. Gonorrhoea was the most important ailment treated (62%), followed by leucorrhoea (20%) [Figure 3]. The importance of each ailment was determined by the number of citations made by the informants.

Use-value

The UV of the plants is used to determine the relative importance of each remedy practice. The UV of each plant species is given in Table 2.

Fidelity Level

FL is the percentage of informants claiming the use of a certain plant for the same purpose. Table 6 shows the FL of all the plant species reported to treat STDs.

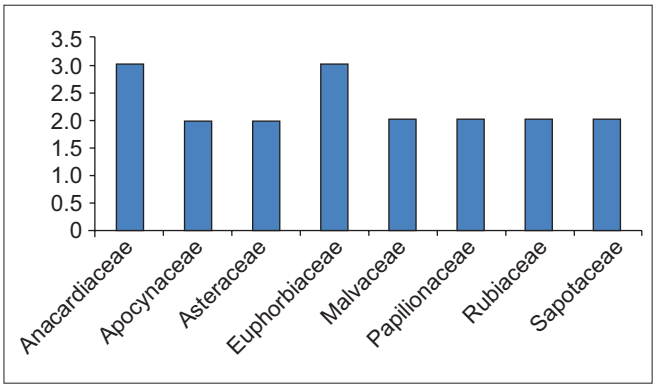

Figure 2: Frequency of plant families

Table 2: Medicinal plants used in Akwa Ibom and Rivers State of Nigeria to treat sexually transmitted diseases

Family	Botanical name	UV	Local name	Plant part used	Method of preparation	Ailment treated, therapeutic effect	Administration, dosage and duration of treatment	Location/Tribe
Agavaceae	*Dracaena arborea* (Willd) Link Enum. Hort.	0.04	Okono nsang	Bark	Infusion	Gonorrhoea	Internal use; 3×1 for 14 days	Akwa Ibom State/ Ibibio
Anacardiaceae	*Anacardium occidentale* L.	0.05	"Cashew"	Leaves	Decoction	Gonorrhoea	External use; 1×1 till recovery	Akwa Ibom State/ Ibibio
	Spondias mombin L.	0.03	Agiriran	Leaves	Decoction	Gonorrhoea	Internal use; 3×1 for 5 days	Rivers State/Ogoni
	Mangifera indica L.	0.03	Manko	Leaves	Decoction	Gonorrhoea, syphilis, urethritis	Internal use; 3×1 for 5 days	Rivers State/ Ikwerre
Apocynaceae	*Rauwolfia vomitoria* Afzel	0.01	Ekiko	Leaves	Decoction	Gonorrhoea	Internal use; 2×1 till recovery	Akwa Ibom State/ Ibibio
	Strophanthus sarmentosus DC	0.02	Ibok idan	Bark	Decoction	Gonorrhoea	Internal use; 3×1 for 7 days	Akwa Ibom State/ Ibibio
Asteraceae	*Crassocephalum crepidioides* (Benth.) S. Moore	0.02	Mkpafit	Leaves	Infusion	Gonorrhoea	Internal use; 2×1 till recovery	Akwa Ibom State/ Ibibio
	Melanthera scadens (Schum and Thonn) Roberty	0.03	Ayara edemeron	Leaves	Crushed in water	Leucorrhoea, urethritis	Internal use; 3×1 for 5 days	Akwa Ibom State/ Ibibio
Caricaceae	*Carica papaya* L.	0.01	"Pawpaw"	Root	Tincture	Syphilis	Internal use; 2×1 for 14 days	Rivers State/Ogoni
Commelinaceae	*Palisota hirsuta* (Thunb.) K. Schum.	0.03	Edon ebod	Leaves	Decoction	Gonorrhoea	Internal use; 3×1 for 14 days	Akwa Ibom State/ Ibibio
Convolvulaceae	*Ipomoea involucrata* P. Beauv.	0.02	Mkpafiafian	Leaves	Infusion	Leucorrhoea, urethritis	Internal use; 3×1 for 5 days	Akwa Ibom State/ Ibibio
Cucurbitaceae	*Citrullus colocynthis* (L.) Schrad	0.05	Ikon, ikpan	Fruit	Decoction	Gonorrhoea, syphilis	Internal use; 2×1 till recovery	Akwa Ibom State/ Ibibio
Euphorbiaceae	*Microdesmis puberula* Hook F. ex Planch	0.02	Ntabit	Leaves	Soup, decoction	Gonorrhoea	Internal use; eaten, 2×1 for 7 days	Akwa Ibom State/ Ibibio
	Alchornea cordifolia (Schum and Thonn.) Muell. Arg.	0.02	Mbom	Leaves	Crushed and juice applied	Gonorrhoea	Internal use; 3×1 for 5 days	Akwa Ibom State/ Ibibio
	Jatropha curcas L.	0.02	OLulu idu	Leaves	Decoction	Gonorrhoea, syphilis	Internal use; 3×1 for 5 days	Rivers State/Ogoni
Icacinaceae	*Lasianthera africana* P. Beauv.	0.01	Editan	Leaves	Infusion with *Guarea thompsonii*	Gonorrhoea	Internal use; taken frequently till recovery	Akwa Ibom State/ Ibibio
Liliaceae	*Allium schoenoprasum* L.	0.01	Aysoohia	Leaves	Tincture	Gonorrhoea	External use; 3×1 till recovery	Rivers State/ Ikwerre
Loganiaceae	*Anthocleista djalonensis* A. Chev.	0.04	Ibu	Root	Decoction	Gonorrhoea	Internal use; 2×1 for 5 days	Akwa Ibom State/ Ibibio
Malvaceae	*Gossypium hirsutum* L.	0.05	Ngobe	Leaves	Decoction, infusion	Gonorrhoea, syphilis	Internal use; 3×1 for 10 days	Rivers State/ Ikwerre
	Hibiscus surattensis L.	0.04	Ubabara	Leaves	Infusion	Gonorrhoea	Internal use; 3×1 for 5 days	Rivers State/ Ikwerre
Marantaceae	*Maranthocloa cuspidata* (Roscoe) Milne-Redh	0.03	Aya	Leaves	Decoction	Gonorrhoea, syphilis, leucorrhoea, urethritis	Internal use; 2×1 till recovery	Akwa Ibom State/ Ibibio

(*Continued*)

Table 2: (*Continued*)

Family	Botanical name	UV	Local name	Plant part used	Method of preparation	Ailment treated, therapeutic effect	Administration, dosage and duration of treatment	Location/Tribe
Meliaceae	*Guarea thompsonii* Sprague and Hutch	0.01	Afia, ikpok eto, udia udung	Stem	Infusion with *Lasianthera africana*	Gonorrhoea	Internal use; 3×1 for 7 days	Akwa Ibom State/ Ibibio
Moraceae	*Ficus exasperata* Vahl.	0.01	Asesa	Leaves, root	Powder	Gonorrhoea, leucorrhoea	Internal use; 2×1 till recovery	Rivers State/ Ikwerre
Musaceae	*Musa paradisiaca* L.	0.04	Okirima	Stem	Crushed and juice applied	Leucorrhoea	Internal use; 3×1 for 7 days	Rivers State/ Kalabari
Palmae	*Elaeis guineensis* jacq.	0.02	Eyop	Root	Powder mixed with kernel oil	Syphilis	Internal use; 3×1 till recovery	Akwa Ibom State/ Ibibio
Papilionaceae	*Lonchocarpus cyanescens* (Schum. and Thonn.) Benth.	0.02	Nji	Leaves and bark	Infusion	Syphilis	Internal use; 3×1 till recovery	Rivers State/ Kalabari
	Baphia nitida Lodd	0.05	Afuo	Leaves	Decoction	Gonorrhoea	Internal use; 3×1 till recovery	Akwa Ibom State/ Ibibio
Piperaceae	*Piper guineense*	0.04	Etinkene odusa	Seeds	Crushed in water	Gonorrhoea, syphilis, leucorrhoea, urethritis	Internal use; 2×1 till recovery	Akwa Ibom State/ Ibibio
Portulacaceae	*Portulaca oleracea* L.	0.01	Uton ekpu	Whole plant	Infusion	Gonorrhoea, syphilis	Internal use; 2×1 till recovery	Akwa Ibom State/ Ibibio
Rubiaceae	*Ixora coccinea* L.	0.01	Orsu	Whole plant	Decoction	Gonorrhoea	Internal use; 3×1 for 5 days	Rivers State/Ogoni
	Nuclea latifolia Sm.	0.02	Kulata	Root	Decoction	Gonorrhoea	Internal use; 3×1 for 5 days	Rivers State/Ogoni
Rutaceae	*Fagara macrophylla* Engl.	0.02	Duku	Bark	Decoction	Gonorrhoea	Internal use; 2×1 for 7 days	Rivers State/ Ekpeye
Sapotaceae	*Chrysophyllum albidum* G. Don	0.05	Udara	Seeds	Decoction	Leucorrhoea	Internal use; 1×1 for 3 days	Akwa Ibom State/ Ibibio
	Syncepalum dulcificum (Schum. and Thonn.) Daniell	0.04	Nkpantun, mkpantuk	Root	Infusion	Gonorrhoea, leucorrhoea	Internal use; 2×1 for 7 days	Akwa Ibom State/ Ibibio
Smilacaceae	*Smilax anceps* Willd	0.04	Jiabana	Root	Decoction	Leucorrhoea	Internal use; 2×1 for 14 days	Rivers State/ Ekpeye
Vitaceae	*Cissus quadrangularis* L.	0.02	Ogbaki	Whole plant	Tincture	Gonorrhoea, syphilis	Internal use; 3×1 for 7 days	Rivers State/ Ekpeeye

1×1, one time daily; 2×1, two times a day; 3×1, three times a day (it means one glass of potion, unless otherwise indicated)

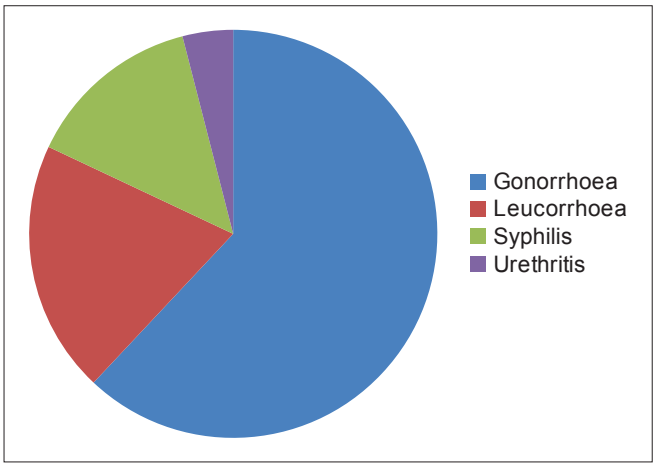

Figure 3: Relative importance of ailments

DISCUSSION

Anacardiaceae and Euphorbiaceae were the most important families, given their number of taxa used to treat STDs in this study. Other important families included Asteraceae, Rubiaceae, Apocynaceae, Papilionaceae, Malvaceae and Sapotaceae. These families are among the most commonly encountered in Nigeria[21-23] and their species are well known. In an ethnobotanical survey conducted among the people of Zegie Peninsula in Ethiopia, Teklehaymanot and Giday[24] reported that out of 44 families used by the people, Euphorbiaceae was among those that provided the largest number of medicinal plants. In another study conducted in Katima Mulilo, Caprivi region, Namibia, to determine the medicinal plants used to manage HIV

Table 3: Medicinal plant citation in Akwa Ibom and Rivers States

Ailment	Botanical name of plant	Number of taxa	Citation	% citation
Gonorrhoea	*Dracaena arborea*	28	63	62
	Maranthocloa cuspidata		16	
	Anacardium occidentale		95	
	Spondias mombin		46	
	Mangifera indica		34	
	Rauwolfia vomitoria		16	
	Strophanthus sarmentosus		31	
	Crassocephalum crepidioides		34	
	Palisota hirsuta		61	
	Citrullus colocynthis		56	
	Microdesmis puberula		37	
	Alchornea cordifolia		38	
	Jatropha curcas		30	
	Lasianthera africana		26	
	Allium schoenoprasum		15	
	Anthocleista djalonensis		79	
	Gossypium hirsutum		44	
	Hibiscus surattensis		70	
	Guarea thompsonii		26	
	Ficus exasperate		12	
	Baphia nitida		91	
	Piper guineense		32	
	Portulaca oleracea		12	
	Ixora coccinea		23	
	Nuclea latifolia		29	
	Fagara macrophylla		31	
	Syncepalum dulcificum		45	
	Cissus quadrangularis		22	
Leucorrhoea	*Piper guineense*	9	17	20
	Chrysophyllum albidum		96	
	Syncepalum dulcificum		27	
	Smilax anceps		66	
	Maranthocloa cuspidata		12	
	Melanthera scadens		28	
	Ipomoea involucrata		24	
	Ficus exasperata		15	
	Musa paradisiaca		77	
Syphilis	*Maranthocloa cuspidata*	11	10	14
	Mangifera indica		18	
	Carica papaya		1o	
	Citrullus colocynthis		40	
	Jatropha curcas		12	
	Gossypium hirsutum		39	
	Elaeis guineensis		41	
	Lonchocarpus cyanescens		41	
	Piper guineense		15	
	Portulaca oleracea		9	
	Cissus quadrangularis		21	
Urethritis	*Piper guineense*	5	9	4
	Maranthocloa cuspidata		14	
	Mangifera indica		10	
	Melanthera scadens		25	
	Ipomoea involucrata		18	

Table 4: Plant parts used

Plant parts used	*N*	Percentage
Leaves	18	49
Stem	2	5
Root	7	19
Seeds	2	5
Whole plant	3	8
Fruits	1	3
Bark	3	8
Leaves and bark	1	3

Table 5: Method of preparation

Method	*N*	Percentage
Crushing	4	11
Decoction	18	47
Tincture	3	8
Powder	2	5
Infusion	10	26
Soup	1	3

opportunistic infections, Anacardiaceae was reported as one of the families mostly used to treat such conditions.[25] Asteraceae was also observed to be the second largest family to treat urinary tract infections (UTIs) and STDs in different tribes of Bangladesh,[26] while Malvaceae was mentioned as one of the important families in Indian ethnomedicine.[27]

Drug discovery approach is usually geared towards these families due to their rich content of secondary metabolites such as flavonoids and saponins.[28] Leaves were observed in this study to be the most commonly used plant part. The use of leaves is found commonly in several reports of ethnobotanical studies.[29-32] The use of leaves offers the advantage of utilising the biodiversity on a sustainable basis over the root or whole plant, since the leaves are regenerative. The most popular method of herbal preparation used in this survey was decoction, followed by infusion and crushing. This finding conforms to the general pattern of medicinal plant use in Africa.[33,34] In some other parts of the world also, decoction was indicated as a common method of herbal preparation.[27,35,36] In this region, all the remedies are prepared in crude form devoid of quality control and standardisation of dosage.[34]

Relative Importance of Ailments

Based on the number of citations by respondents, gonorrhoea was the most frequently mentioned STD treated in this survey. Gonorrhoea has also been observed to be the most commonly treated STD in other parts of the country.[4,6,21,22,37] A similar finding was made during the ethnobotanical survey of TMPs of different tribes of Bangladesh,[26] where gonorrhoea was reported as the most frequently mentioned STD treated.

Table 6: Fidelity level of medicinal plants

Species	Therapeutic uses	Fidelity level %
Alchornea cordifolia	Gonorrhoea	100
Allium schoenoprasum	Gonorrhoea	100
Anacardium occidentale	Gonorrhoea	100
Anthocleista djalonensis	Gonorrhoea	100
Baphia nitida	Gonorrhoea	100
Carica papaya	Syphilis	100
Chrysophyllum albidum	Gonorrhoea	100
Cissus quadrangularis	Gonorrhoea, Syphilis	51
Citrullus colocynthis	Gonorrhoea, Syphilis	58
Crassocephalum crepidioides	Gonorrhoea	100
Dracaena arborea	Gonorrhoea	100
Elaeis guineensis	Syphilis	100
Fagara macrophylla	Gonorrhoea	100
Ficus exasperata	Gonorrhoea, Leucorrhoea	56
Gossypium hirsutum	Gonorrhoea, Syphilis	53
Guarea thompsonii	Gonorrhoea	100
Hibiscus surattensis	Gonorrhoea	100
Ipomoea involucrata	Leucorrhoea, Urethritis	57
Ixora coccinea	Gonorrhoea	100
Jatropha curcas	Gonorrhoea, Syphilis	71
Lasianthera Africana	Gonorrhoea	100
Lonchocarpus cyanescens	Syphilis	100
Mangifera indica	Gonorrhoea, Syphilis, Urethritis	55
Maranthocloa cuspidate	Gonorrhoea, Syphilis, Leucorrhoea, Urethritis	31
Melanthera scadens	Leucorrhoea, Urethritis	53
Microdesmis puberula	Gonorrhoea	100
Musa paradisiacal	Leucorrhoea	100
Nuclea latifolia	Gonorrhoea	100
Palisota hirsuta	Gonorrhoea	100
Piper guineense	Gonorrhoea, Syphilis, Leucorrhoea, Urethritis	44
Portulaca oleracea	Gonorrhoea, Syphilis	57
Rauwolfia vomitoria	Gonorrhoea	100
Smilax anceps	Leucorrhoea	100
Spondias mombin	Gonorrhoea	100
Strophanthus sarmentosus	Gonorrhoea	100
Syncepalum dulcificum	Gonorrhoea, Leucorrhoea	63

Relative Importance of Medicinal Plants

The UV of each plant species was used to compare the relative importance of each remedy. The most important medicinal plant species were: *Anacardium occidentale* (UV = 0.05), *Citrullus colocynthis* (UV = 0.05), *Gossypium hirsutum* (UV = 0.05) and *Chrysophylum albidium* (UV = 0.05). The medicinal plants having lower UV indicated that consensus was little amongst the TMPs on the medicinal plant knowledge and remedies that were effective in these communities. The major reason is that some of the uses of these medicinal plants are not known to some of these TMPs. However, where they are known, there is disagreement on their efficacy. Thus, there is need for pharmacological evaluation of the plant species to determine their efficacy.[38-41]

Similarly, medicinal plants that are commonly used by people had higher FL value than those that are less common. Furthermore, medicinal plants that formed remedies for a single ailment had 100% FL, while those that are used for more than a single ailment gave lower FL values. For instance, *Baphia nitida* used for gonorrhoea gave 100% FL, while *Portulaca oleracea* used for both gonorrhoea and syphilis showed 57% FL.

Scientific literature was surveyed for validation of the uses of medicinal plants reported by informants in this research, since STDs are common throughout the world [Table 7]. This suggests their significance in the traditional medicines of other countries. Twenty-five plant species (65%) used by the Niger Delta communities are also used in other parts of Nigeria and the world for similar and other ailments.

Spondias mombin L. leaf decoction is used in other parts of Nigeria to cure gonorrhoea,[42] as it is used in the Niger Delta Region. However, the method of preparation for treating gonorrhoea in Suriname's traditional medicine is leaf infusion.[43] In Guatemala, the ethnomedicinal use of the plant for gonorrhoea was validated against *Neisseria gonorrhoeae* and the plant was reported to show moderate effect.[44] The antimicrobial effects of the plant against other microorganisms such as *Bacilius subtilis* and *Staphylococcus aureus* have also been reported.[45-47] These antimicrobial activities have been attributed to chemical constituents such as phenolic acids, anthraquinones, flavonoids, and tannins.[46,47]

Though the leaves of *Palisota hirsuta* are used by the indigenes of Niger Delta Region to treat gonorrhoea, other parts such as, root and stem twigs are also used in other regions of Nigeria to treat the same ailment.[48] In Cote D'Ivoire, *P. hirsuta* is also prescribed against gonorrhoea, while the decoction of the whole plant is used for urethral discharge.[49] In Gabon, the stem of the plant is made into draught under the sun to cure urethral discharge,[50] while in Sierra Leone, the roots boiled with lime are used to treat gonorrhoea in 3 days.[51] In rationalising the ethnomedicinal uses of *P. hirsuta*, Anani *et al.*,[52] reported significant activity of the methanol extract of the plant against test bacteria such as *Sta. aureus* and *Escherichia coli*, and viruses including Herpes simplex, one of the causative agents of STDs.[8] In another study, the methanol extract of the plant was also reported to inhibit bacteria such as *Sta. aureus* and *Streptococcus pyogenes*.[53]

In many countries, the bark of *Mangifera indica* is the part mostly employed for medicine;[54] however, the part used in this study is the leaves. In India, the bark of the plant

Table 7: Comparison of medicinal plants used in the Niger Delta Region for STDs with those used in other parts of the world

Plant species	Ailment	Country
Ageratum conyzoides	STDs, syphilis, urinogenital infection, urethral pain, cystitis, leucorrhoea	Nig[63], N/A[64], Tog[66]
Alchornea cordifolia	Dysentery, skin disease urinary ailment, venereal disease	Nig[21,70], Gha[42], W/A[71]
Anacardium occidentale	Malaria, asthma, diabetes urethra discharge Ulcer	Nig[21,70], Pan, Tri[72] Con[73] Gab[50]
Anthocleista djalonensis	Skin disease, malaria, infertility	Nig[21,42]
Baphia nitida	Fever, laxative Dysentery, venereal disease	Nig[21] W/A[71]
Carica papaya	Diabetes, gonorrhea, syphilis Purgative, hernia, venereal disease Anthelmintic, syphilis Burns, wound, asthma	Nig[70,74] CD[75], Gha[76] E/A[77] Ame[78], Mex[72]
Cissus quadrangularis	Scabies	DRC[79]
Crassocephalum crepidioides	Epilepsy Stomach upset	Tan[80] Con[73]
Dracaena arborea	Abdominal pain Abscess	Nig[21] Cam[81]
Elaeis guineensis	Vermifuge Lumbago, malaria	Nig[70] Cam[81]
Fagara macrophylla	Diarrhea, dysentery	Ang[10]
Gossypium hirsutum	Dysentery, emmanagogue	Nig[70]
Guarea thompsonii	Gonorrhea, abscess	Cam[81]
Ipomoea involucrata	Fever, rheumatism Edema, eye infection, dismenorrhoea	Nig[21,82] Con[73]
Ixora coccinea	Gonorrhea Leucorrhoea, dismenorrhoea	Nig[42] Ind[27]
Jatropha curcas	Gonorrhea, epilepsy, oral thrush Diarrhea	Nig[21,42,83] Per[31]
Lasianthera Africana	Oral hygiene	Gha[71]
Lonchocarpus cyanescens	Skin disease, yaw, snake bite Insecticide	Nig[21,70] W/A[71]
Mangifera indica	Diarrhea, laxative Venereal disease Arthritis, migraine Diabetes	Nig[21,82] Sen[84,85], Ind[55], Fiji[56] CD[73] Ban[36]
Microdesmis puberula	Cough, sexual dysfunction	Cam[81]
Musa paradisiaca	Measles, hypertension Toothache	Nig[21,70] S/A[71]
Nuclea latifolia	Malaria, dismenorrhoea	Nig[83,86]
Palisota hirsuta	Stomachache Cough, gonorrhea, urethral discharge, edema	Nig[74] Nig[48], CD[49], S/L[51], Gab[50], Gha[76]
Rauwolfia vomitoria	Mental illness, convulsion, aphrodisiac Jaundice Epilepsy, sedative	Nig[70,87], Gha[88,42] Con[73] CD[89]
Spondias mombin	Malaria, gonorrhea, Venereal disease	Cam[81], S/Ame[90], Sur[43]
Syncepalum dulcificum	Diabetes	W/A[71]

Nig – Nigeria; Gha – Ghana; Sen-Senegal; Con – Congo Brazzaville; Gab – Gabon; CD – Cote D'Ivoire; Tan – Tanzania; DRC – Democratic Republic of Congo; Cam – Cameroon; Tog – Togo; Ang – Angola; W/A – West Africa; E/A – East Africa; S/A – South Africa; N/A – North Africa; S/Ame – South America; Ind – India; Sur – Suriname

is mixed with lime juice and given for 7 days for acute gonorrhoea,[55] while in Fiji, an infusion of the dried bark is made and given orally to cure syphilis.[56] The plant has been reported to contain mangiferin, a C-glycosyl-xanthone, in its different parts such as root,[57] leaves,[58] stem bark and fruit.[59] The antimicrobial activity of the plant has been attributed to mangiferin.[54] For instance, mangiferin was reported to show antimicrobial activity against some bacteria including *Bacillus cereus*, *Sta. aureus* and *E. coil,* and *Aspergillus flavus* and *Aspergillus fumigatus*.[60] The compound was also reported to inhibit the late event in Herpes simplex virus (HSV-2) replication[61] and to antagonise the cytopathic effects of HIV.[62]

In Owo, Ondo State of Nigeria, the leaves of *Ageratum conyzoides* are used as a decoction to cure STDs.[63] In North

Africa, the decoction of the root is used to treat STDs such as syphilis, urinogenital infection, urethral pain, urinary disease, cystitis and leucorrhoea,[64] while the decoction of the leaves and stem is used for the same diseases in Togo.[65] In Ebolowa region of Cameroon, the powdered leaves mixed with rock salt are extracted in water and the filtrate drunk to cure syphilis.[66]

In validating the traditional uses of *A. conyzoides* against STDs, Ogunshe *et al*.,[67] reported that the ethanol extract of the leaves showed good inhibitory effect against strains of vaginal *Lactobacillus* and *Candida* species associated with candida vaginitis. The whole plant extract was also reported to show bactericidal effect against organisms such as *E. coli* and *Sta. aureus* at 6 mg/ml.[68] Other bacteria inhibited by the plant were *Bacillus cereus, Klebsiella aerogenes* and *Str. pyogenes*.[69]

CONCLUSION

The medicinal plants used may serve as source of new and effective drugs, and the TMPs may serve as additional source of health manpower.

REFERENCES

1. World Health Organization. WHO global burden of disease: 2004 update. 2008 Available from: http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/index.html. [Last accessed on 2004 and last update on 2008].
2. Mati J. STD/HIV screening, diagnosis and treatment within health programme in Sub-Saharan Africa. In: Sanghvi H, Lewison D, Baltimore MD, Piego JM, editors. Issues in management of STDs in a Family Planning Setting: Workshop proceeding. Baltimore MD: JHPIEGO; 1995. p. 13-5.
3. United Nations Development Programme (UNDP). Niger Delta Human Development Programme. Nigeria: UNDP, Garki, Abuja; 2006.
4. Ogunbanjo BO. Sexually transmitted diseases in Nigeria. A review of the present situation. West Afr J Med 1989;8:42-9.
5. Available from: http://www.NigeriaHIVinfo.com. The HIV/AIDS situation in Nigeria. [Last accessed on 2006].
6. Catterall, RD. Sexually transmitted diseases in Nigeria. Br J Vener Dis 1980;56:194-6.
7. Ebong RD. Sexual promiscuity: Knowledge of danger in higher institutions of higher learning. J R Soc Health 1994;114:137-9.
8. Bakare RA. Sexually transmitted infections in Nigeria. Annals Ibadan Postgrad Med 2005;3:48-51.
9. Available from: http://www.UNAIDS/WHO. Epidermological fact sheets on HIV/AIDS and sexually transmitted infections. [Last accessed on 2004].
10. Sofowora A. Medicinal plants and traditional medicine in Africa. Nigeria: Spectrum Books Ltd; 1993.
11. Petters SW, Iwok ER, Uya OE. Akwa Ibom State: The land of Promise-A Compendium. Nigeria: Gabumo Press; 1994.
12. Udo EA. Who are the Ibibio? Nigeria: FEP Publishers; 1984.
13. Talbot PA. The peoples of Southern Nigeria. Vol. 4. London: Frank Cass and Co. Ltd; 1969.
14. Wikipedia. Rivers State. Available from: http://en.wikipedia.org. [Last accessed on 2010].
15. Available from: http://www.OnlineNigeria.com. Rivers State. [Last accessed on 2003].
16. Huntington HP. Using traditional ecological knowledge in science: Methods and applications. Ecol Appl 2000;10:1270-4.
17. Martin GJ. Ethnobotany: A methods manual. London: Chapman and Hall; 1995.
18. Maundu P. Methodology for collecting and sharing indigenous knowledge: A case study. Indigenous Knowledge Development Monitor 1995;3:3-5.
19. Philips O, Gentry AH, Reynel C, Wilki P, Gavez-Durand CB. Quantitative ethnobotany and Amazonian conservation. Conserv Biol 1994;8:225-48.
20. Alexiades MN. Advances in Economic Botany. Vol. 10. Selected guideline for ethnobotanical research: A field manual. Bronx: The New York Botanical Garden; 1996.
21. Nigerian Natural Medicine Development Agency (NNMDA). Vol. 1. Medicinal Plants of Nigeria: South-West, Nigeria. Nigeria, Lagos: NNMDA; 2006.
22. Federal Ministry of Health. Nigerian Herbal Pharmacopoeia. 1st ed. Nigeria: Federal Ministry of Health; 2008.
23. Ajibesin KK, Ekpo BA, Bala DN, Essien EE, Adesanya SA. Ethnobotanical survey of Akwa Ibom State of Nigeria. J Ethnopharmacol 2008;115:387-408.
24. Teklehaymanot T, Giday M. Ethnobotanical study of medicinal plants used by people in Zegie Peninsula Northwestern Ethiopia. J Ethnobiol Ethnomed 2007;3:12.
25. Chinsembu KC, Hedimbi M. An ethnobotanical survey of plants used to manage HIV/AIDS opportunistic infections in Katima Mulilo, Caprivi region, Namibia. J Ethnobiol Ethnomed 2010;6:25.
26. Hossan MS, Hanif A, Agarwala B, Sarwar MS, Karim M, Rahman MT, *et al*. Traditional use of medicinal plants in Bangladesh to treat urinary tract infections and sexually transmitted diseases. Ethnobot Res Appl 2010;8:61.
27. Sankaranarayanan S, Bama P, Ramachandran J, Kalaichelvan PT, Deccaraman M, Vijayalakshimi M, *et al*. Ethnobotanical study of medicinal plants used by traditional users in Villupuram district of Tamil Nadu, India. J Med Plant Res 2010,4:1089-11.
28. Desmarchelier C, Witting-Schaus F. Sixty medicinal plants from the Peruvian Amazon: Ecology, Ethnomedicine and Bioactivity. UK, Devon: NHBS; 2000.
29. Tene V, Malagón O, Finzi PV, Vidari G, Armijos C, Zaragoza T. An ethnobotanical survey of medicinal plants used in Loja and Zamora-Chinchipe, Ecuador. J Ethnopharmacol 2007;111:63-81.
30. Busman RW, Sharon D. Traditional medicinal plant use in Northern Peru: Tracking two thousand years of healing culture. J Ethnobiol Ethnomed 2006;2:47.
31. Luziatelli G, Sørensen M, Theilade I, Mølgaard P. Ashaninka medicinal plants: A case study from the native community of Bajo Quimiriki, Junin, Peru. J Ethnobiol Ethnomed 2010;6:21.
32. Sanz-Biset J, Campos-de-la-Cruz J, Epiquién-Rivera MA, Cañigueral S. A first survey on the medicinal plants of the Chazuta valley (Peruvian Amazon). J Ethnopharmacol 2009;122:333-62.
33. African Plants Database. Available from: http://www.ville-ge.ch/musinfo/bd/cjb/africa/. [Last accessed on 2011 June 8].
34. International Plant Names Index. Available from: http//www.ipni.org/index.html. [Last accessed on 2011 June 8].
35. Taylor L. The healing power of rainforest herb (Serial online). Available from URL: Available from: http://raintree.com/picaopreto.htm. [Last assessed on 2005].
36. Rahmatullah M, Rahman ME, Hasan E, Ahmed R, Jamal F, Jahan R, *et al*. A survey of medicinal plants used by the folk medicinal practitioners of Shetabganj village in Dinajpur district, Bangladesh. Am-Eurasian J Sustainable Agric 2010;4:196-3.
37. Sogbetan AO, Alausa KO, Osoba AO. Sexually transmitted diseases in Ibadan, Nigeria. Br J Vener Dis 1977;53:155-60.

38. Mazumder UK, Gupta M, Manikandan L, Bhatacharya S. Antibacterial activity of *Urena lobata* root. Fitoterapia 2001;72: 927-9.
39. Cos P, Vlietnick AJ, Berghe DV, Maes L. Anti-infective potential of natural products: How to develop a stronger *in vitro* 'proof-of-concept'. J Ethnopharmacol 2006;106:290-302.
40. Aquil F, Ahmad I. Antibacterial properties of traditionally used Indian medicinal plants. Methods Find Exp Clin Pharmacol 2007;29:79-92.
41. Gosh A, Das BK, Roy A, Mandal B, Chandra G. Antibacterial activity of some medicinal plant extracts. J Nat Med 2008;62:259-62.
42. Irvine FR. Woody plants of Ghana. London: Oxford University Press; 1961.
43. Wikipedia. Spondias mombin. Available from: http://en.wikipedia.org [Last accessed on 2011].
44. Cáceres A, Menéndez H, Méndez E, Cohobón E, Samayoa BE, Jauregui E, *et al*. Antigonorrhoeal activity of plants used in Guatemala for the treatment of sexually transmitted diseases. J Ethnopharmacol 1995;48:85-8.
45. Ajao AO, Shonukan. Antibacterial effect of aqueous and alcohol extracts of *Spondias mombin* and *Alchomea cordifolia*: 2 local antimicrobial remedies. Int J Crude Drug Res 1985;23:67-72.
46. Corthout J, Pieters L, Claeys M, Geerts S, Vanden BD, Vlietinck A. Antibacterial and molluscicidal phenolic acid from *Spondias mombin*. Planta Med 1994;60:460-3.
47. Abo KA, Ogunleye VO, Ashidi JS. Antimicrobial potential of *Spondias mombin*, *Croton zambesicus* and *Zygotritonia crocea*. Phytother Res 1999;13:494-7.
48. Odugbemi T. Outlines and Pictures of medicinal plants from Nigeria. Nigeria: University of Lagos Press; 2008.
49. Bouquet A, Debray M. Medicinal plants of Ivory Coast. France: Works and Documents of the Office of Scientific and technical Research Overseas, Paris; 1974.
50. Walker AR, Silans R. The useful plants of Gabon. France: Paul Lechevalier, Paris; 1961.
51. Burkill HM. The Useful Plants of West Tropical Africa. 2nd ed. Vol. 1. Family A-D. UK: Royal Botanic Gardens, Kew, Richmond; 1985.
52. Anani K, Hudson JB, de Souza C, Akpagana K, Tower GH, Arnason JT, *et al*. Investigation of medicinal plants of togo for antiviral and antibacterial activities. Pharm Biol 2000;38:40-5.
53. Anaga AO, Eke IG, Chah KF. Some pharmacological properties of methanolic extract of *Palisota hirsuta*. J Trop Veterin 2009;27:37-47.
54. Wauthoz N, Balde A, Balde ES, Van Damme M, Duez P. Ethnopharmacology of *Mangifera indica* L. Bark and Pharmacological Studies of its Main C-Glucosylxanthone, Mangiferin. Int J Biomed Pharm Sci 1997;1:112-9.
55. Panda H. Herbs, cultivation and medicinal uses. India: National Institute of Industrial Research, New Delhi; 2000.
56. Ross IA. Medicinal Plants of the world, Chemical constituents, Traditional and Modern Medicinal Uses. Totowa: Humana Press; 1999.
57. Nigam SK, Mitra CR. Constituents of mango (*Mangifera indica*) roots. Indian J Chem1964;2:378-9.
58. Desai PD, Ganguly AK, Govindachari TR, Joshi BS, Kamat VN, Manmade AH, *et al*. Chemical investigation of some Indian plants: Part II. Indian J Chem 1966;4:457-9.
59. El Ansari MA, Rajadurai S, Nayudamma Y. Studies on the polyphenols of *Mangifera indica* bark. Leather Sci 1967;14:247-1.
60. Stoilova I, Gargova S, Stoyanova A, Ho L. Antimicrobial and antioxidant activity of the polyphenol mangiferin. Herb Pol 2005;51:37-44.
61. Zhu XM, Song JX, Huang ZZ, Wu YM, Yu MJ. Antiviral activity of mangiferin against herpes simplex virus type 2 *in vitro*. Zhongguo Yao Li Xue Bao 1993;14:452-4.
62. Guha S, Ghosal S, Chattopadhyay U. Antitumor, immunomodulatory and anti-HIV effect of mangiferin, a naturally occurring glucosylxanthone. Chemotherapy 1996;42:443-51.
63. Kayode J, Jose RA, Ige OE. Conservation and Biodiversity Erosion in Ondo State, Nigeria: (4), Assessing Botanicals Used in the Cure of Sexually Transmitted Diseases in Owo Region. Ethnobot Leaflet 2011;13:734-8.
64. Boulos L. Medicinal plants of North Africa. Michigan: Reference Publishers Incorporated, Algonac; 1983.
65. Noumi E, Eloumou ME. Syphilis ailment: Prevalence and herbal remedies in Ebolowa subdivision (South region, Cameroon). Int J Pharm Biomed Sci 2011;2:20-8.
66. Adjanohoun EV, Adjakidje MR, Ahyi K, Akpagana P, Chibon A, El-hadji J, *et al*. Contribution to ethnobotanical and floristic studies in Togo. France: Agency for Cultural and Technical Cooperation (ACCT), Paris; 1986.
67. Ogunshe AA, Lawal OA, Iheakanwa CI. Effects of simulated preparations of plants used in Nigerian traditional medicine on *Candida* species associated with vaginal candidiasis. Ethnobot Res Appl 2008;6:373-3.
68. Ngemenya MN, Mbah JA, Tane P, Titanji VP. Antibacterial effects of some Cameroonian medicinal plants against common pathogenic bacteria. Afr J Trad CAM 2006;3:84-93.
69. Perumal Samy R, Ignacimuthu S, Raja DP. Preliminary screening of ethnomedicinal plants from India. J Ethnopharmacol 1999;66:235-40.
70. Mann A, Gbate M, Umar AN. Medicinal and economic plants of Nupeland. Nigeria: Jude Evans Books and Publications; 2003.
71. Lewis WH, Elvin-Lewis MPH. Medical Botany: Plants affecting human health. New York: John Wiley and Sons; 2003.
72. UK CROPNET. Available from: http://ukcrop.net/perl/ace/grep/EthnobotDB. [Last accessed on 2003].
73. Bouquet A. Witch doctors and traditional medicine of Congo (Brazzaville). France: O.R.S.T.O.M. Mémoire, Paris; 1969.
74. Ainslie JR. A list of plants used in medicine in Nigeria. UK: Imperial Forestry Institute, Oxford University; 1937.
75. Kerharo J, Bouquet A. Medicinal and poisonous plants of the Ivory Coast – Upper Volta. France: Vigot Fréres, Paris; 1950.
76. Irvine FR. Woody plants of Ghana. London: Oxford University Press; 1930.
77. Bandeira SO Albano G, Barbosa FM. Diversity and uses of plant species in Goba, Lebambo mountains, Mozambique, with emphasis on trees and shrubs. In: J. Timberlake, S. Kativu, editors. African Plants: Biodiversity, Taxonomy and uses. London, Royal Botanic Gardens: Kew, Richmond; 1999.
78. Milliken W, Miller RP, Pollard SR, Wandelli EV. The ethnobotany of the Waimiri Atoari Indians of Brazil. UK: Royal Botanical Gardens, Kew, Richmond: 1992.
79. Chifundera, K. Contribution to the inventory of medicinal plants from the Bushi area, South Kivu Province, Democratic Republic of Congo. Fitoterapia 2001;72:351-68.
80. Haerdi F, Kerharo FJ, Adam JG. African medicinal plants.Plantes médicinales africaines. Germany: Publisher of Law and Society, Basel; 1964.
81. Betti JL. An ethnobotanical study of medicinal plants among the Baka Pygmies in the Dja Biosphere Reserve, Cameroon. Afr Study Monogr 2004;25:1-27.
82. Oliver B. Medicinal plants in Nigeria. Nigeria, Lagos: Nigerian College of Arts, Science and Technology; 1960.
83. Ekpendu TO, Anyogo P, Ityough D, Akpa F. Nigerian ethnomedicine and medicinal plant flora: the Benue experience, Part 3. Nig J Nat Prod Med 2000;4:13-22.
84. Kerharo, J, Adam JG. Senegalese traditional pharmacopoeia. Medicnal and poisonous plants. France: Vigot Fréres, Paris; 1974.

85. Kerharo J, Adam JG. In: Haerdi F, Kerharo FJ, Adam JG, editors. Medicinal and poisonous and magical plants of Niominka and Saloum Islands (Senegal). Germany: Publisher of Law and Society, Basel; African Medicinal Plants 1964b.
86. Association for Scientific Identification, Conservation and Utilization of Medicinal plants of Nigeria, their Uses (ASICUMPON). Checklist of Medicinal Plants of Nigeria and Their Uses. Enugu, Nigeria: Jamoe and Trinity-Biz Publishers; 2005.
87. Adegoke EA, Akinsanya A, Naqvi SH. Studies of Nigerian medicinal plants 1: A preliminary survey of plant alkaloids. J West Afr Sci Assoc 1968;13:13-33.
88. Ayensu ES. Medicinal plants of West Africa. Algonac: Michigan, Reference Publications; 1978.
89. Adjanohoun E, Ake Assi L. Pharmaceutical plants of Ivory Coast. Ivory Coast, Abidjan: National Florist Centre, University of Abidjan; 1972.
90. Taylor L. Technical Data Report for Ubos (*Spondias mombin*). NV, Carson City; Raintree Nutrition Inc.; 2006.

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