



Ethnobotanic Survey of Aids Opportunistic Infections in the Ziguinchor District, Sénégal

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Authors' contributions

This work was carried out in collaboration among all authors. Author KD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors WD and ADF managed the analyses of the study. Authors SIMD, AIM and IM performed the statistical analysis. Author ADF managed the literature searches and approved the final corrections. All authors read and approved the final manuscript.

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ABSTRACT

HIV / AIDS infection is characterized by the reduction of the body's defenses favoring the occurrence "opportunistic" infections, as bronchitis, mycoses and tuberculosis etc. Thus, to fight against this virus, antiretrovirals are used.

The Ziguinchor district (Senegal) has a higher seroprevalence rate of 2.2% above the national average of 0.7%. It is in this sense that a survey of two herbalists, 35 tradipraticians and eight resource persons was conducted to identify the plants used in the management of opportunistic AIDS diseases because as the populations often resort to phytotherapy. 88 plants were identified and divided into 79 genera and 38 families. Some species were mentioned very more frequently and in many diseases. These are: *Cordia pinnata* Poir. (78%), *Guiera senegalensis* (73.1%), *Khaya senegalensis* (67%), *Isocarpha oliviformis* (55%), *Terminalia macroptera* (55%), *Cassia sieberiana* (47%), etc. Leaves and roots constituted the greatest use in the form of macerated, infused, for drinking, bathing, or fumigation, etc. The expected result during this study was the establishment of a repertory of medicinal plants used for the management of opportunistic diseases.

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1. INTRODUCTION

At the end of 2000, the Joint United Nations Program on HIV / AIDS (UNAIDS) reported 36.1 million men, women and children living with HIV worldwide, and 21.8 million people swept away by AIDS. Although AIDS is currently present in all countries.

The infection rates in highly developed countries such as Europe, Japan, Australia, and in Islamic countries are low, followed in a second row by North and Latin America. The situation in sub-Saharan Africa is worse. 1.1% of the world population are infected. The rate in North Africa and in Europe comes to 0.3%, but in sub-Saharan Africa to 7.4%. Although only 13% of the world's total population lives in sub-Saharan Africa, 65% of all people worldwide infected by HIV and 75% of deaths caused by AIDS can be found there. It affects more particularly sub-Saharan Africa, home to 70% of adults and 80% of children living with HIV and the district of the world with the lowest medical resources [1].

Currently the main cause of death in Africa, AIDS has provoked a devastating impact on villages, communities and families. In many African countries, the rate of new infections is increasing to such an extent that the social fabric could be destroyed. In many of these countries, AIDS-related illnesses and socio-economic hardships are reducing life expectancy at high speed. Finally, of the 13.2 million AIDS orphans in the world, 12.1 million are in Africa [2]. Data from 2016 indicates that there were approximately two million new cases of HIV infections, and as many as one million deaths due to the disease [3]. In fact, African men and women worldwide are more affected by this disease than any other race [3,4]. Only ten countries in southern and eastern Africa, including South Africa (25%), Nigeria (13%), Mozambique (6%), Uganda (6%), Tanzania (6%), Zambia (4%), Zimbabwe (6%), Kenya (6%), Malawi (4%) and Ethiopia (3%), account for approximately 80% of HIV patients [3,4]; In most countries, the prevalence of HIV is the highest in specific groups including men who have sex with men, intravenous drug users, people in prisons and other confined settings, sex workers and transgender individuals. However, unlike other countries, the primary HIV transmission mode in sub-Saharan Africa is through heterosexual sex, with a concomitant

epidemic in children through vertical transmission [5]. As a consequence, African women are disproportionately affected and make up ~58% of the total number of people living with HIV, have the highest number of children living with HIV and the highest number of AIDS related deaths [6].

However, Senegal has a low HIV prevalence rate (0.7%) [7], thanks to the Senegalese Access Initiative for Antiretrovirals (ISAARV) set up since 1998 making Senegal the first country in Africa to offer therapeutic treatment through a public program strengthened in 2003 by free ARV's. Despite this low rate, the Ziguinchor district recorded a highest HIV seroprevalence rate in Senegal, it is 2.2% for 15-49 years [8]. Among other factors explaining this high rate of prevalence, the medical authorities advance the "vulnerability" of the district experiencing a "social crisis" punctuated by the move of populations, early sexuality, socio-cultural practices such as excision and circumcision. Although the virus was known, no vaccine was available to prevent transmission of the virus and no treatment can completely cure the disease. Fight against AIDS is thus to fight against these opportunistic affections especially with phytotherapy often accessible and low cost for a better global management of this infection. Although effective, ART is not without serious adverse events, which is especially evident in persons undergoing long-term treatment. In addition, the current therapies are limited by emergence of multidrug resistance [9], and new drugs and novel targets are needed to overcome the issues of HIV reservoirs in the body in order to have the complete eradication of HIV and AIDS. On the other hand, traditional healing practices have existed in Africa long before conventional medicine, and attempts by colonial governments and early religious missionaries to suppress them have failed. A tank of knowledge, philosophy and history that was still unexploited, traditional medicine offers treatment possibilities and was a national heritage, as well as a means of connecting people to their land. Often, in some cases, traditional medicine has proven to be as, if not more effective than, biomedical treatment for HIV-related opportunistic infections, such as shingles and chronic diarrhea [1]. As a result, the World Health Organization (WHO) has advocated since the early 1990's the integration of traditional healers into national AIDS programs [10]. Plants, as evolutionary responses to

infections by fungi, nematodes, and other organisms, to avoid herbivory, and to compete for light and space, produce numerous secondary metabolites such as phenolics, glycosides, alkaloids, coumarins, terpenoids, essential oils and peptides. These metabolites have been identified with different biological activities [3]. It is with this in mind that a survey was conducted among traditional healers and herbalists in the Ziguinchor district to identify the plants used in the management of opportunistic AIDS infections. The objective of this study is therefore to list all the medicinal plants used to treat these opportunistic diseases.

2. MATERIALS AND METHODS

2.1 Study Area

The survey was conducted in all three district. The Ziguinchor district has an area of 7339 km², lies at 12°34'59 " N Latitude and 16°16'18"W Longitude with a population of 549151 peoples. It has a Sub-Guinean climate and a total annual rainfall of 1190.1 mm / year [8]. Below representative map of the survey area (Fig. 1).

2.2 Vegetation Description

The region is influenced by the sub-Guinean climate, favoring high rainfall compared to the central and northern regions of the country. We note the formation of a forest estate consisting of dry dense forests and gallery forests located

mainly in the southern part. The mangrove and the palm grove colonize the zone fluviomaritime, one also notes the presence of rônèraies [8].

2.3 Socio- economic Conditions

The Ziguinchor region has strong economic potential for its emergence. However, the isolation of the region, combined with the crisis it is experiencing, is a handicap to start a harmonious economic development. The main economic activities are agriculture, fishing and tourism. The latter is experiencing crises in recent years following the crisis in the region and the emergence of Ebola virus disease.

2.4 Study Design

This study was conducted using a pre-established questionnaire. It covered the period from January 2013 to March 2013. The majority of tribe ethnic encountered were Jola, Pulaar and Serer.

2.5 Collection, Identification and Classification

The unknown species of our interviews had been collected and identified in the laboratory of Botany of Cheikh Anta Diop University by Pr Diatta (Botany). The classification was made using the books of Kerharho, [11], Eklou-Natey [7] and the new classification APG III (2014).



Fig. 1. Map of the survey area (Ziguinchor)

2.6 Statistical Analysis

The database software, SPSS version 3 was used for data linkage and processing. Regular statistics (percentage) were displayed for the frequency of plants quoted. We have used as quantitative analysis such as Use- Value (UV).

3. RESULTS AND DISCUSSION

A total of 88 plant species from 79 genera and 35 families were identified as plants against opportunistic infections. The families, botanical names, local names, common names, used plants, Part used and preparation (application) are given in Table 1 classified according to [4], [12] and APG III classification (2014).

Some families are more often cited because they include several species. Thus, Fabaceae families with 24 species ; Combretaceae with 6 species ; Malvaceae, Meliaceae and Euphorbiaceae, with 5 species; Anacardiaceae, Apocynaceae and Rubiaceae with 4 species; and Myrtaceae with 3 species; Annonaceae, Oleaceae, Arecaceae, Rutaceae and Sterculiaceae with 2 species and everything else is represented by a single species (Fig. 2). These results are not in agreement with those found by [2] who obtain that families Combretaceae and Euphorbiaceae 7 species each, Anacardiaceae and Rubiaceae 6 species. All of the reported plant species, with each family having three or more species associated with the treatment of the opportunistic infections documented. The Fabaceae family contains many species of plants known for nutritional and medicinal value. These include the *Acacia nilotica* species that has shown antioxidant and antiinflammatory activity [13]. The *Pterocarpus erinaceus* species has shown antiinflammatory, analgesic and antipyretic activity [14]. Combretaceae families has shown In vitro anti-HIV activity of various extracts prepared from the stem bark of *Combretum molle* widely used in Ethiopian traditional medicine for the treatment of liver diseases, malaria and tuberculosis has been assessed against human immunodeficiency virus type 1 (HIV-1) and type 2 (HIV-2) [10]. The Combretaceae plant family contains several species that are known to be Anti – inflammatoire, immunomodulatory, antinociceptive, antidiabétique, hypotenseur, antioxidant etc. [15,16,5]. Euphorbiaceae family contain plant species that have been source of medicine and some have shown potential at experimental stages. *Jatropha curcas* and *Ricinus communis*

has shown antioxidant properties and have an inhibitory action on acetylcholinesterase activity [7].

The foregoing literature findings suggest that plants from the three families contain ingredients that are useful for diseases.

The most frequently mentioned plants are: *Cordyla pinnata* Poir. (78%), *Guiera senegalensis* J.F. Gmel. (73.1%), *Khaya senegalensis* (Desr.) A. Juss (67%), *Icacina oliviformis* (Poir) J.Rayanal. (55%), *Terminalia macroptera* J.F. Gmel. (55%), *Cassia sieberiana* (DC.) (47%), *Pterocarpus erinaceus* Poir. (40%), *Anacardium occidentale* L. (38%) *Adansonia digitata* (L). (35%) *Citrus aurantifolia*. (Christm.) Swingle (31%) *Combretum molle* Perr. ex DC. (27%) *Bridelia micrantha* Mull. Arg. (27%) *Flemingia faginea* (Burm.f.) Merr and *Sarcocephalus latifolius* (Smith) Bruce are (27%). These results are little similar to those of Faye [2] found 14 plants for the treatment of opportunistic diseases. These two authors have two similar species among the species mentioned by our interviewees: *Pterocarpus erinaceus* and *Guiera senegalensis*. The highest number of plant species used to treat the various conditions. These result can be explain to a same environment in Senegal. It was followed by Asthenia with 28, Encephalitis (26), Tuberculosis (25), Bronchitis (24), Oral candidiasis (22), diarrhea (22), Anemia, Furuncle, mycosis and Aphtha (19) ; Weight delay (14). (Fig. 3). Faye [2] found the same diseases types in the Kaolack and Fatick area which is consistent with this survey.

Twelve of the 88 plants species were used to manage only one of the ten conditions reported, 19 were used to manage two up to six of the conditions, while one plant species only, *Khaya senegalensis* (Desr.) A. Juss was used to treat all the ten reported disease conditions.

The study revealed that leaves were the most popular parts used in preparing herbal remedies and comprised 53% of all the reports on use of plant parts. This was followed by roots (42%), stem or bark (4%) and other parts of plants like fruits or seeds (1%) (Fig. 4). These results are according to Faye [2] who demonstrate that leaves are mainly used during treatments traditional. This is understandable because the pathology involved and the area geographical study are different.

Table 1. Plant species to threat against HIV/AIDS opportunity diseases

Families and botanical names	Common names	Vernacular name	Affections	Used parts	Preparation	Quote percentage (%)
<i>Abrus precatorius</i> (L) (Fabaceae)	Liana licorice	Basesen (Dio)	Furuncle	Leaves	Infusion	2
<i>Acacia macrostachya</i> Reichenb. ex DC. (Fabaceae)	Indetermined	Fu likot (Dio)	Encephalitis	Roots	Fumigation	2
<i>Acacia nilotica</i> (L) Willd. ex Del (Fabaceae)	Red gum	Bano (Dio)	mycosis	Leaves	Application	2
<i>Adansonia digitata</i> (L) (Malvaceae)	Baobab tree	Boubag(Dio)	Diarrhea, Bronchitis Asthenia and Weight delay	Roots, Leaves and Fruit	Infusion and Maceration	35
<i>Azalia africana</i> Sm.ex Pers (Fabaceae)	Mahogany bean	Bu leo (Dio)	Anemia, Diarrhea, Bronchitis and Oral Candidiasis	Leaves, Stems, Root	Infusion	11
<i>Alchornea cordifolia</i> (Schumach. & Thom.) Mull. Arg (Euphorbiaceae)	Alchornea cordata	Fusubo (Dio)	Encephalitis, Mycosis and Bronchitis	Leaves, Roots and Stem	Infusion and Maceration	9
<i>Anacardium occidentale</i> L. (Anacardiaceae)	apple mahogany tree	Bukavu (Dio)	Diarrhea and Encephalitis	barks	Infusion and Maceration	38
<i>Ancistrophyllum secundiflorum</i> (Cycadaceae)	Indetermined	Ka likoteuk (Dio)	Encephalitis	Roots	Fumigation	2
<i>Annona senegalensis</i> Subsp. senegalensis (Annonaceae)	Annone	Fulolok (Dio)	Diarrhea	Stem	Masticate	11
<i>Anthocleista nobilis</i> G.Don (Gentianaceae)	Cabbage tree	Burisassay (Dio)	Tuberculosis	Roots	Infusion	2
<i>Arachis hypogea</i> L. (Fabaceae)	Peanut	Badagati(Dio)	Aphtha	Seeds	Broil and Applicate	15
<i>Azadirachta indica</i> (Meliaceae)	Neem tree	Nivaquine (Wo)	Encephalitis	Leaves	application to the head	9
<i>Borassus aethiopum</i> Mart. (Arecaceae)	Palm tree	Duladu (Dio)	Candida, Mycosis, Aphtha and Diarrhea	Leaves and Fruits	Infusion ; Broil and Applicate	13
<i>Bridelia micrantha</i> Mull. Arg (Euphorbiaceae)	Gambecola Bridelia	Fu leukirefu (Dio)	Anemia, Aphtha, Oral Candidiasis and Encephalitis	Roots and Leaves	Infusion, Maceration and Fumigation	27
<i>Calotropis procera</i> (Ait.) Ait.f. (Asclepiadaceae)	Sodom Apple	Poftane (Wo)	Encephalitis and Mycosis	Leaves	application to the head	11
<i>Calycobolus africanus</i> (G.Don) Heine (Convolvulaceae)	Indetermined	Bu kinguerab (Dio)	Anemia	Barks	Infusion	2
<i>Carica papaya</i> L. (Arecaceae)	Papaya	Bu papay (Dio)	Candida, Anemia and Encephalitis	immature fruit, Leaves and Roots	Infusion and Maceration	7
<i>Cassia nigricans</i> (Fabaceae)	nigrican Cassia	Bembehuey (Dio)	Tuberculosis	Leaves	Infusion	2
<i>Cassia occidentalis</i> (Fabaceae)	False Kinkéliba	Kaputanaban (Dio)	Diarrhea	Leaves	Infusion	2
<i>Cassia sieberiana</i> DC.(Fabaceae)	Sieber Cassia	Fu sandiaf (Dio)	Candida, Aphtha, Diarrhea, Furuncle, Bronchitis, Furuncle, Encephalitis and Asthenia	Leaves and Roots	Infusion, Maceration and Fumigation	47
<i>Cassia tora</i> L. (Fabaceae)	Stinky Cassia	E KANGUL	Encephalitis and Tuberculosis	Leaves	Fumigation	4
<i>Cassytha filiformis</i> L.(Lauraceae)	Senegalese Cassytha	Bunamad (Dio)	Weight delay	Stem	Maceration	9
<i>Casuarina equisetifolia</i> (Myrtaceae)	Filao tree	Filao (Fr)	Asthenia	Leaves	Infusion	2
<i>Ceiba pentandra</i> (L.) Gaertn. (Malvaceae)	Cheese tree	Fromager (Fr)	Furuncle	thorns	Infusion	2
<i>Celtis toka</i> (Ulmaceae)	African hackberry	Busingilit (Dio)	mycosis	Roots	Maceration	2
<i>Citrus aurantifolia</i> (Christm.) Swingle (Rutaceae)	Lemon	Bu lemuna ba firé (Dio)	Bronchite, Diarrhea, Asthenia and Tuberculosis	Fruit and Leaves	Infusion	31
<i>Cnestis cornilata</i> (Connaraceae)	Indetermined	Ka derak(Dio)	bronchitis	Leaves	Fumigation	2
<i>Cola cordifolia</i> (Cav.) R.Br. (Sterculiaceae)	Sterculia cordifolia	Bou bom karamba (Dio)	Tuberculosis	Stem	Maceration	2
<i>Combretum lecardii</i> Engl & Diel (Combretaceae)		Bosontab (Dio)	Furuncle	Leaves	Infusion	2
<i>Combretum micranthum</i> G. Don (Combretaceae)	Kinkeliba	Bu guilay (Dio)	Aphtha, Bronchitis Diarrhea, Asthenia	Roots, Fruits and Sap	Infusion, Maceration and applicate	15
<i>Combretum molle</i> (Combretaceae)	Indetermined	Bu parenab	Candida	Leaves and Barks	Infusion and Maceration	29
<i>Combretum nigricans</i> Lepr Guill et Perr. (Combretaceae)	Vai kinkeliba	Funt (Dio)	Anemia	Barks	Maceration	2

Families and botanical names	Common names	Vernacular name	Affections	Used parts	Preparation	Quote percentage (%)
<i>Cordyla pinnata</i> (Lepr ex A. Rich) Milne-Redhea (Fabaceae)	Pear Kayor tree	Bu pokotin (Dio)	Aphtha, Candida, Furuncle, and Asthenia	Roots and Barks	Infusion and Maceration	78
<i>Cucurbita pepo</i> L. (Cucurbitaceae)	Pumpkin	Fu safaf (Dio)	Asthenia	Fruits	Decoction	2
<i>Daniellia ogea</i> (Harms) Rolfe (Fabaceae)	Incense tree	Elinteye (Dio)	Furuncle	Leaves	Infusion	2
<i>Daniellia oliveri</i> (Rolfe) Hutch & Dalz (Fabaceae)	Terebinthe	Bu balinab (Dio)	Encephalitis, Aphtha and Asthenia	Roots, Barks, Fruits	Maceration, Fumigation and Applicate	7
<i>Detarium microcarpum</i> Guill. & Perr (Fabaceae)	Detar Small	Tabac (Fr)	Tuberculosis	Leaves	Fumigation	4
<i>Detarium senegalense</i> Gmel (Fabaceae)	Tallow tree	Bu gungut (Dio)	Tuberculosis, Diarrhea, Mycosis and Encephalitis	Leaves, Barks and Fruits	Infusion, Maceration and Applicate	13
<i>Dialium guineense</i> Willd. (Fabaceae)	Black tamarind	Bu bufarakal (Dio)	Candida, Weight delay and Encephalitis	Roots and Barks	Maceration	15
<i>Eucalyptus globulus</i> (Myrtaceae)	Eucalyptus	hotou boutéle (Dio)	bronchitis	Leaves	Infusion	7
<i>Ekebergia capensis</i> Sparrm. (Meliaceae)	Charia chevalieri	Fepay ka fitak (Dio)	Asthenia	Stem	Maceration	2
<i>Ficus exasperata</i> Vahl (Moraceae)	Glass Paper	Bu pundun (Dio)	Anemia, Tuberculosis, Asthenia, Bronchitis and Encephalitis	Leaves and Roots	Infusion	17
<i>Flemingia faginea</i> (Burm.f.) Merr (Fabaceae)	Moghania faginea	Bapomabo (Dio)	Bronchitis, Mycosis, Aphtha, Furuncle and Tuberculosis	Barks and Roots	Infusion and Maceration	27
<i>Faidherbia albida</i> (Del.) Chev (Fabaceae)	Kade	Bu birik (Dio)	Candida, Encephalitis and Aphtha	Roots	Maceration	15
<i>Fluggea virosa</i> (Roxb. ex Willd.) Voigt (Euphorbiaceae)	Indetermined	E buker (Dio)	Tuberculosis and Bronchitis	Leaves	Fumigation	4
<i>Gardenia ternifolia</i> Schumach. & Thonn (Rubiaceae)	Indetermined	Kalenak (Dio)	Furuncle, Mycosis, Oral candidiasis and Encephalitis	Roots and Herbs	Infusion and Maceration	13
<i>Gossypium barbadense</i> L. (Malvaceae)	Cotton Plant	Eful (Dio)	Diarrhea	Leaves	Infusion	9
<i>Guiera senegalensis</i> J.F. Gmel (Combretaceae)	Nger	Efunuk (Dio)	Bronchitis, Diarrhea and Tuberculosis	Leaves and Roots	Infusion	73
<i>Hibiscus sabdariffa</i> L. (Malvaceae)	Guinea sorrel	Ku guésak (Dio)	Asthenia	Leaves	Infusion	2
<i>Holarrhena floribunda</i> (G. Don) Dur. & Schinz (Apocynaceae)	Holarrhena floriferous	Fu mataf (Dio)	Furuncle	Leaves	Infusion	4
<i>Icacina oliviformis</i> (Poir) J.Rayanal var. oliviformis (Icacinaceae)	Mappia Senegalensis	Furabang (Dio)	Furuncle, Weight delay and Anemia	Roots and Barks	Maceration	55
<i>Jatropha curcas</i> L.(Euphorbiaceae)	Pourghèr	E tabanae (Dio)	Candida and Mycosis	Fruits	Maceration	7
<i>Khaya senegalensis</i> (Desr.) A. Juss (Meliaceae)	Caïlcedrat	Bu kayb Dio	Furuncle, Anemia, Mycosis, Asthenia, Tuberculosis, Bronchitis Candida, Aphtha, Encephalitis and Weight delay	Leaves and Barks	Infusion and Maceration	67
<i>Landolphia heudelotii</i> A. DC (Apocynaceae)	Gohine Liana	Bufem (Dio)	Weight delay, Aphtha and Candida	Roots	Infusion and Maceration	7
<i>Lannea acida</i> A. Rich. (Anacardiaceae)	Acid Grape tree	Ka guelenak (Dio)	Furuncle and Tuberculosis	Barks and Roots	Maceration and Applicate	7
<i>Leptadenia hastata</i> (Pers.) Decne (Fabaceae)	Cynanchum hastaum	Futakadf (Dio)	Asthenia, Candida, Diarrhea, Weight delay and Tuberculosis	Leaves and Roots	Infusion and Maceration	17
<i>Leptoderris fasciculata</i> (Benth.) Kunth (Fabaceae)	Leptoderris Dinklagei, Harms	Fu gon (Dio)	Encephalitis, Asthenia, Diarrhea and Weight delay	Roots and Leaves	Maceration	11
<i>Mangifera indica</i> L.(Anacardiaceae)	Mango	Bu mangu (Dio)	Aphtha and Candida	Barks	Maceration	9
<i>Mucuna pruriens</i> (L.) DC. Var utilis (Wall. Ex Wight) (Fabaceae)	Scratching hair	Nana (Dio)	Diarrhea	Leaves	Maceration	2
<i>Opilia amentacea</i> Roxb. (Oleaceae)	Groutia celdifolia	Fu missaf (Dio)	Encephalitis, Aphtha Mycosis, Asthenia	Roots and Barks	Infusion and Maceration	17
<i>Parinari excelsa</i> Sabine (Chrysobalanaceae)	False dalbergia	Bu welélodia (Dio)	Dermal mycosis	Leaves	Applicate	2

Families and botanical names	Common names	Vernacular name	Affections	Used parts	Preparation	Quote percentage (%)
<i>Parkia biglobosa</i> (Jacq.) R. Br. ex G. Don (Fabaceae)	Nété	Bu guilay (Dio)	Candida, Anemia, Diarrhea and Aphtha	Leaves and Barks	Infusion and Maceration	13
<i>Pericopsis laxiflora</i> (Benth.) Meeuwen (Fabaceae)	False Dalbergia	Bu kukula (Dio)	Asthenia Furuncle, Mycosis Encephalitis	Leaves and Roots	Infusion and Maceration	9
<i>Piliostigma reticulata</i> (DC.) Hochst (Fabaceae)	wine waiter	Kafalataku (Dio)	Tuberculosis, Bronchitis And Encephalitis	Barks	Infusion	11
<i>Piper guineense</i> Schumach. & Thonn. (Piperaceae)	Kissi pepper	Fukugen (Dio)	Furuncle	Roots	Infusion	2
<i>Prosopis africana</i> Taub. (Fabaceae)	Prosopis	Ka kukuleuk (Dio)	Asthenia, Bronchitis, Encephalitis and Tuberculosis	Roots and Barks	Infusion and Maceration	15
<i>Psidium guajava</i> L. (Myrtaceae)	Guava	Bu goyabab (Dio)	Diarrhea	Leaves	Infusion	11
<i>Psorospermum senegalense</i> Spach. (Hypericaceae)	Indetermined	Katidakumo (Dio)	Anemia, Asthenia, Tuberculosis, Bronchitis, and Furuncle	Leaves, Roots and Barks	Infusion	20
<i>Psychotria peduncularis</i> (Sabalib.) var. <i>peduncularis</i> (Rubiaceae)	Cephalis debauxii	Saybanou guiléne (Dio)	Weight delay	Roots	Maceration	2
<i>Pterocarpus erinaceus</i> Poir. (Fabaceae)	Vene	Bu kon (Dio)	Anemia, Asthenia, Candida, Weight delay and Tuberculosis	Leaves and Barks	Infusion and Maceration	40
<i>Quassia undulata</i> (Guill. & Perr.) F.Dietr (Simaroubaceae)	Sugarcane of Elephant	Kukufutab (Dio)	Anemia, Mycosis and Furuncle	Leaves and Barks	Infusion and Applicate	15
<i>Ricinus communis</i> L. (Euphorbiaceae)	Ricin	ka kotat (Dio)	Mycosis	Leaves	Applicate	2
<i>Saba senegalensis</i> (A. DC.) Pichon (Apocynaceae)	saba Liana	Sindipasu (Dio)	Bronchitis and Asthenia	Leaves	Infusion	7
<i>Sarcocephalus latifolius</i> (Smith) Bruce (Rubiaceae)	African sin	Fumulunduluk (Dio)	Weight delay, Asthenia, Bronchitis and Encephalitis	Roots	Maceration	27
<i>Schwenckia americana</i> L. (Solanaceae)	Schwenkia guineensis	Tim timi (So)	Tuberculosis	Roots and Stem	Maceration	2
<i>Securidaca longepedunculata</i> Fres. (Polygalaceae)	Drug From the snake	Kaderac ou Djaray (Dio)	Anemia Bronchitis, Asthenia	Roots and Barks	Fumigation and Applicate	17
<i>Spermacoce verticillata</i> L. (Rubiaceae)	Whorled Borrerie	Erabauney (Dio)	Mycosis	Leaves	Applicate	2
<i>Spondias mombin</i> L. (Anacardiaceae)	Mombin plum	Bu libab (Dio)	Asthenia	Roots	Infusion	2
<i>Strychnos spinosa</i> Lam. (Strychnaceae)	Bush orange	Patakoulé (Dio)	Asthenia	Roots	Maceration	2
<i>Stylosanthes fruticosa</i> (Retz.) Alston (Stylosanthes)	Arachis fruticosa	Bank égotir (Dio)	bronchitis	Leaves	Infusion	4
<i>Terminalia macroptera</i> Guill. & Perr. (Meliaceae)	Senegalese Badamier	Bu wanga (Dio)	Tuberculosis, Asthenia, Candida, Aphtha, Anemia, Mycosis, Bronchitis and Furuncle	Leaves, Roots and Barks	Infusion and Maceration	55
<i>Tetracera alnifolia</i> Willd. Subsp. <i>alnifolia</i> (Dilleniaceae)	Liane Waters	Fu fut (Dio)	Furuncle and Tuberculosis	Leaves and Seeds	Maceration and Fumigation	4
<i>Trichilia prieureana</i> A. Juss. Subsp. <i>Prieureana</i> (Meliaceae)	Senegalese Trichilia	Kalobudonak (Dio)	Asthenia, Furuncle and Encephalitis	Leaves and Barks	Infusion and Maceration	9
<i>Vernonia colorata</i> (Willd.) Drake (Asteraceae)	Bitter leaf	Docteur (So)	Diarrhea	Leaves	Infusion	2
<i>Vitex doniana</i> Sweet (Verbenaceae)	Black plum tree	Bu guink (Dio)	Diarrhea, Candida, Asthenia, Aphtha, Bronchitis and Weight delay	Leaves and Barks	Infusion	22
<i>Waltheria indica</i> L. (Sterculiaceae)	America Waltheria	Fulutafu (Dio)	Aphtha, Candida and Diarrhea	Roots and Stem	Maceration and Applicate	17
<i>Ximenia americana</i> L. (Oleaceae)	Sea plum tree	Bu ripina (Dio)	Tuberculosis	Roots and Barks	Infusion	7
<i>Xylopia aethiopum</i> (Dunal) A.Rich. (Annonaceae)	Black pepper	Kaleo (Dio)	Anemia	Roots	Infusion	2

(Dio): Diola; (So): Socé; (Wo): Wolof; (Fr): French

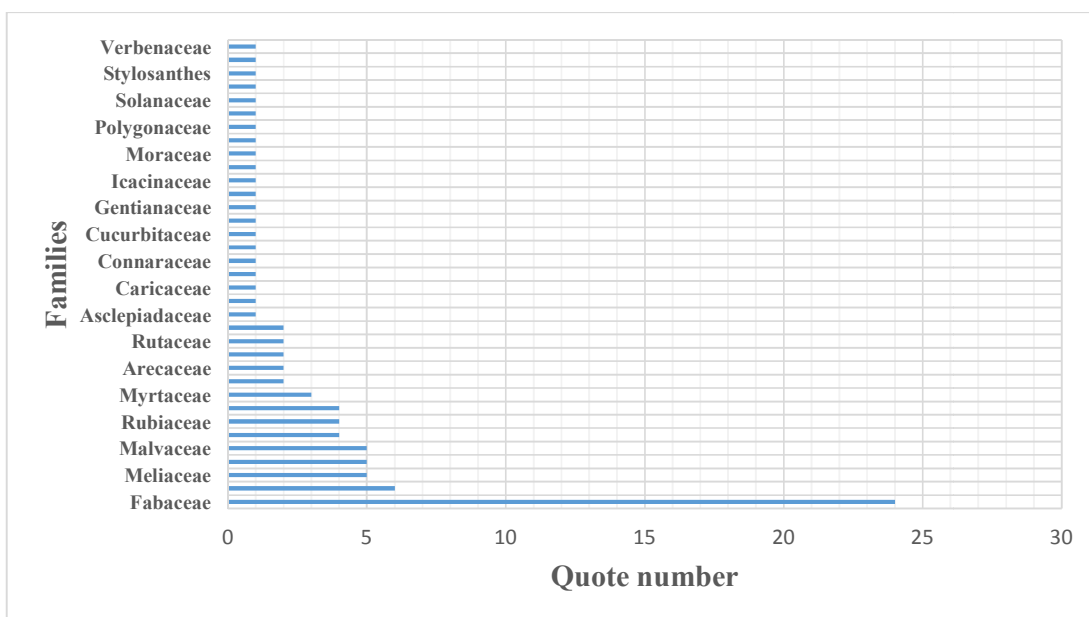


Fig. 2. Families classification plant

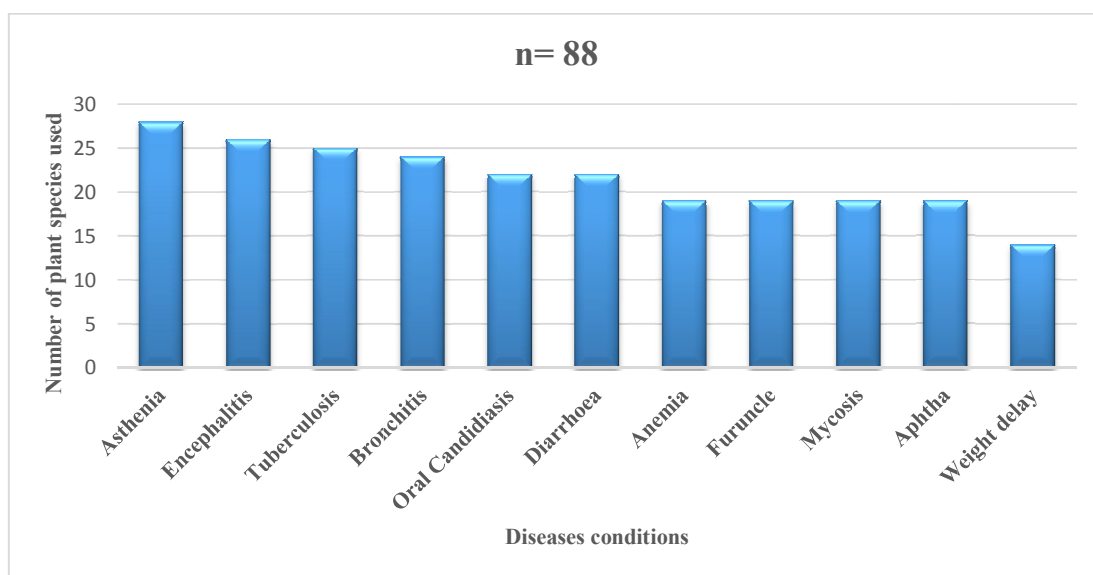


Fig. 3. Disease conditions versus the number of plant species used to treat them

Most of these plant parts were harvested unsustainably without putting any consideration for future resource availability. For example, there was evidence of total ring barking of trees, total uprooting or cutting of the whole plant.

The infusion (57.95%) is the most used mode, followed by maceration. These result are not according to Faye [2] who obtain at first the decoction (50%) followed the infusion (7%). This

difference in medical preparation may be due to the differences between the species found on both sides of the planet. Similarly, the use of *Psidium guava* and *Vernonia colarata* to treat Diarrhoea is consistent with data reported by [2]. Such a similarity in the cross-cultural usage of plant remedies is a strong indication of the bioactivity potential of the reported plants.

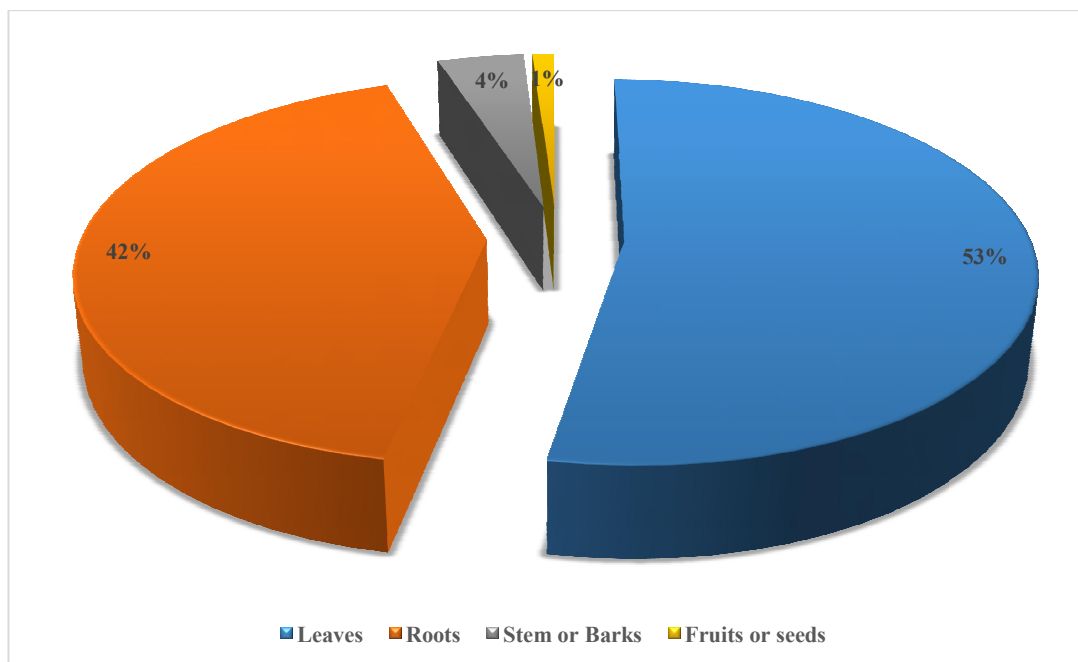


Fig. 4. Percentage use of plant parts

4. CONCLUSION

It is concluded that the information provided forms a significant basis for conservation of the reported remedies, considering that a greater percentage of the plant parts were used. A continuous unsustainable harvesting of these plant parts (leaves and roots) might be eventually lead to disappearance of these invaluable resources if early conservation measures are not taken. There would be a need to engage in value adding and standardization of the herbal preparations by developing the necessary dosages and packaging of the herbal formulations. The ethnopharmacological information reported forms a crucial lead for further research to identify and isolate bioactive constituents which might be developed to drugs for the management of the HIV/AIDS opportunistic infections.

CONSENT

It is not applicable.

ETHICAL APPROVAL

There are no ethical considerations the people surveyed were chosen according to their consent.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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