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## Traditional Medicines for HIV/AIDS and Opportunistic Infections in North-West Cameroon: Case of Skin Infections

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Case Study

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### ABSTRACT

**Background:** The aim of this study was to evaluate the treatment of HIV/AIDS with locally available medicinal plants and its opportunistic infections, mainly skin diseases, in the population of Mezam Division, North-West Cameroon.

**Methods:** Information was gathered from 3 target groups: patients registered in the regional hospital of Bamenda; patients encountered during fieldwork; and traditional healers.

**Results:** The prevalence of HIV/AIDS is real in the Mezam Division and girls and women are relatively more infected. Out of thirty-five former and new patients interviewed, 8.5% used only anti-retroviral drugs (ARV) and 20% used both conventional and traditional medicines. Forty-one plant species belonging to 39 genera and 23 families were collected. They form 29 therapeutic preparations used to treat the pandemic. Ten patients were "treated", i.e. they were symptom-free in this awareness-based medicine. Traditional healers used preparations made of *Aloe barteri*, *Artemisia annua*, *Citrus aurantiifolia*, *Moringa oleifera* and *Vernonia guinneensis*. Opportunistic skin infections such as herpes zoster, kaposi's sarcoma and ringworm were easily treated by *Aloe barteri*, *Leea guineensis*, *Pteleopsis hylodendron* and *Zehneria scabra*. Chemistry and pharmacology confirm the virtues of these plants, as they produce flavonoids, antioxidants and antifungals.

**Conclusion:** The traditional healers of the Mezam Division overcome non-complicated HIV/AIDS-related disorders. The chemical composition of plant species used in the combined therapy principle shows some efficiency of the therapeutic preparations used.

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## **1. INTRODUCTION**

HIV/AIDS is an Acquired Immune Deficiency Syndrome (AIDS) caused by the Human Immuno Deficiency Virus (HIV) (Cecil and Russel, 1988). It is a disease that reduces progressively the effectiveness of the immune system and leaves the patient susceptible to opportunistic diseases (Weiss, 1993). Two types of human immunodeficiency virus (HIV-1 and HIV-2) are responsible for the Acquired Immuno-Deficiency Syndrome (AIDS).

The type of immune cells attacked by HIV is known as cluster determinant 4 (CD4) lymphocytes. A person infected with HIV may look and feel well for many years and may not know that he or she is infected. Such a person, at this stage, can be said to be seropositive; but as the person's immune system weakens, he or she becomes increasingly vulnerable to illnesses, thereby paving the way for a more complicated health condition described as Acquired Immune Deficiency Syndrome (AIDS). The only way for someone to know his or her HIV status is to go to the hospital or health centre for a blood test.

If a patient has no symptoms and his CD4 count is greater than 350 cells/ $\mu$ L and viral load is less than 100,000, therapy is not recommended. If the CD4 count is between 210 and 350 and the person has no symptoms, he and his doctor should decide whether to start treatment. If the CD4 count is less than 200, it is recommended to start treatment. If the patient has severe symptoms or he/she has an AIDS-defining condition, it is recommended that he/she begins treatment (Kallings, 2008). A partial list of the world's common HIV-related opportunistic infections and diseases include: - Bacterial diseases such as tuberculosis, bacterial pneumonia and septicaemia (blood poisoning); - Fungal diseases such as ringworm; viral diseases such as herpes simplex and herpes zoster (Davidson, 2002); - HIV-associated malignancies such as Kaposi's sarcoma. As we see, the antiretroviral treatment is not a cure, since it aims to keep the amount of HIV in the body at a low level.

Lots of studies have been done with emphasis on epistemology and pathogenesis of the HIV infection (Montagnier, 1992, Kisangau et al., 2007), and others on the use of medicinal plants to treat viral infections (Thomas and Géreau, 1993, Ares, et al., 2001; Bessong et al., 2004; Yongabi et al., 2009; Noumi and Anguessin, 2010). The religious approach is not sloppy (Abel et al., 1995). AIDS is now a pandemic (Kallings, 2008). In 2007, it was estimated that 33 million people lived with the disease worldwide, and that 25 million people had died of AIDS since 1981 (Kallings, 2008). In Cameroon, the prevalence had risen from 34.3% in September 2006 to 37.1% at the end of December 2007 (Anonymous, 2007). Despite this prevalence rate, it is difficult to produce a vaccine because different types of HIVs are present (Davidson, 2002). All the types cannot be diagnosed using current methods of investigation. The approach used now on the field is the use of antiretroviral (ARV) drugs in special or particular centers called day care centers, attached to hospitals. Some patients still shy away from these centers because of the stigma attached to HIV/AIDS patients. But if these ARV drugs were given in all hospital pharmacies like other drugs, HIV/AIDS patients would like to hide in the crowd and collect their ARV drugs, with only the pharmacy attendant knowing their status.

There is also an inadequate supply of ARVs. Patients in remote areas don't have the opportunity of receiving free ARVs because of the absence of day care centers in such areas. The most alarming problem with ARV drugs is that a sizeable number of infected persons have stayed aloof, claiming that these drugs no longer give any positive effects on their health. Many said they can no longer rely on widely prescribed efavirenz, nevirapine and lamivudine which currently seem to create more irritation. "The drugs now provoke unbearable headache, vomiting, hunger and general body weakness. This was not the case before. Several patients also noted that the routine therapies instead cause scabies, diarrhea and temporary loss of memory. There is also a first-line drug resistance and the need for a second-line therapy. Infected persons who are resistant to ARV drugs have stopped treatment with these drugs and have switched to medicinal plants for help. As a pandemic, HIV/AIDS brings about a whole share of opportunistic illnesses. Skin opportunistic illnesses are those taken in account in this work. In the study area, the traditional healers pretend to totally treat AIDS and its symptoms and even declare to have been getting successes for a long time. Can this study confirm the high belief that the traditional healers of Mezam Division overcome HIV/AIDS troubles with their therapeutic preparations?

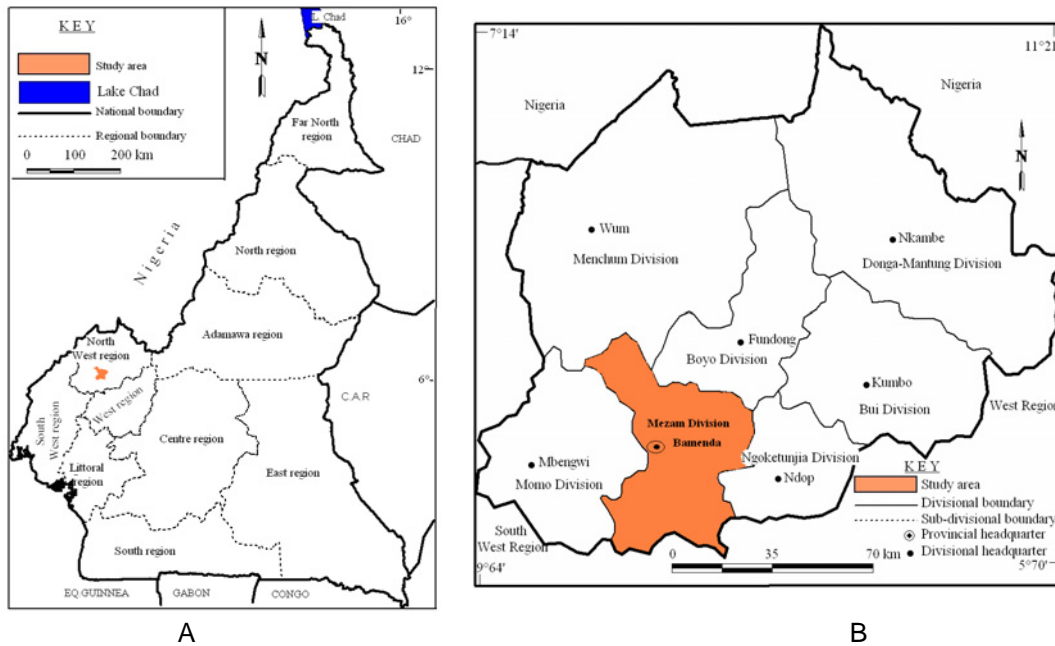
The goal of the work is to gather all useful information to the tentative treatment of HIV/AIDS and skin opportunistic infections in the Mezam Division, North-West Cameroon, and to open a curative gate in a short- or long-term.

## **2. MATERIALS AND METHODS**

### **2.1 Study Area**

Mezam is one of the seven divisions of the North-West Region of Cameroon, the high lands of West Cameroon (Figure 1). The bulk of the Mezam population is basically made up of the native Bamileke. The current language used most is the pidgin (simplified and Africanized English), though the official language is English. The local population depends on hunting, fishing, and traditional subsistence agriculture for a livelihood. The population was estimated at 524,127 inhabitants in 2010, representing 30.3% of the population of the region and 2.7% of the population of Cameroon (anonymous Republic of Cameroon, 2010). The climate is equatorial, the average of rainfalls and temperature being 2,214 mm and 20.44°C, respectively (Suchel, 1972).

The work was carried out in 2008-2010. Three fieldworks were done in Mezam Division, the study area. The target population in this study consisted of person living with HIV/AIDS, and herbalists who treat the said diseases. Information was obtained through two multiple-choice questionnaires. The patients were interviewed on their awareness of HIV/AIDS and the associated diseases, the treatments followed and their efficiency. The traditional healers were asked questions related to plants and preparations used, as well as the methods of administration of the phytomedicines.



**Fig. 1. Study area on the map of Cameroon. A) North-West Region (reddish mark) on the map of Cameroon, B) Mezam Division in the North-West Region (reddish colour).**  
 (Source: NIC, Yaoundé, 2010)

Many problems were encountered:

- a) Reluctance and threats by some herbalists to cooperate. They thought the researchers were going to learn how to treat HIV/AIDS and consequently make much money from it.
- b) Many of the HIV/AIDS patients were not open from the start, fearing that their HIV/AIDS patient status could be made public.

As a result, many of them refused to fill the questionnaires. Some even refused to confirm their status.

After we obtained the consent of the persons willing to contribute to the research, proper clarifications were given and the anonymous questionnaires were distributed to respondents, who completed them and returned them back the same day. For the sake of preserving spontaneity preventing bias in the answers, the researchers did not participate in completing the questionnaire with the respondents. The method being adopted followed the criteria outlined by Johns et al. (1990); Hedberg (1993), Waller (1993); Bruni et al. (1997) when conducting interviews. Some patients accepted that the researchers make photos of their affected body parts and publish them where necessary. The traditional healers who had cooperated to this work showed the plants used to treat prostatic illnesses and indicated the various recipes and some patients treated or under treatment. A numeric camera enabled us to take the pictures of the plants whose parts had been harvested as voucher specimen. Plant classification and nomenclature follow those of Aubréville et al. (1963-1998), Vivien and Faure (1985), Biholong (1986), Lebrun and Stork (1991-1997). The chemical and biochemical data of plants were searched in the scientific literature. The goal was to

determine the effectiveness of their extracts on the treatment of prostate diseases. The results were treated and analyzed in a computer using MS Word and Excel programs.

The plants listed as treating HIV/AIDS were collected, pressed, dried, and identified by the author. All identifications were confirmed by the technical personal of the Cameroon National Herbarium (HNC) (YA), Ministry of Scientific and Technical Research. Data collected were compared with those from Cameroon ethnobotany as well as from other African countries, and analyzed against scientific literature (Kerharo and Adam, 1974). Quantitative analysis was performed using the method outlined by Bruni et al. (1997) and adapted by Noumi (2010). Based on that work where the Exploitation Index (EI) is concerned with all the ethnopharmacological plants and therapeutic preparations of a region, the Usage Index (UI) is deducted and is related only to the ethnopharmacological data of an ailment in a given site. So, the evaluation of the number of medical preparations and the determination of the percentage of plants found in the Mezam Division, which are actualized for the medicinal treatment of prostatic ailments, may provide a good indication of the degree of phytotherapeutic usage.

Hence, the Usage Index (UI) was calculated using the formula:

$$UI = \%Pm \times AMP,$$

Where %Pm is the percentage of plants used for prostatic diseases and AMP the average number of medicinal preparation per plant.

This method makes it possible to readily mathematically compare the information gathered on the same site or on different sites and concerning the same or different diseases. Moreover, by applying this approach, it would be possible to make an objective comparison of ethnopharmacological data obtained from various sites worldwide. Voucher herbarium specimens were deposited at the Plant Biology Laboratory of the Higher Teachers' Training College, University of Yaoundé I, Cameroon. Also there is kept a full record of the completed questionnaires is also on file.

### **3. RESULTS AND DISCUSSION**

#### **3.1. Results**

##### **3.1.1. HIV/AIDS Morbidity at the regional hospital of Bamenda**

HIV/AIDS morbidity at the regional hospital of Bamenda (2002-2007) is obtained from the register. The higher infection rate was observed to be 41.36% in 2003. The women are always the most affected by the pandemic. One could note a low infection rate in 2007 (24.36%) (Table 1).

**Table 1. HIV/AIDS morbidity at the regional hospital of Bamenda (2002-2007)**

Year	Number of detected persons	Number of seropositive women	Number of seropositive men	Infection rate (%)
2002	1400	188	120	22
2003	1690	520	179	41.36
2004	4453	669	244	30.22
2005	3556	1091	329	39.93
2006	4329	1223	466	39.01
2007	4343	637	421	24.36

#### 4.1.2 Plants species and recipes

The plants used in the treatment of HIV/AIDS in the Mezam Division are represented in Table 2, in an alphabetic order according to their families. Species of each family are presented in an alphabetical order according to their genera. Forty-one plant species belonging to 39 genus and 23 families were collected during the field trips. The most represented families were *Asteraceae* with 5 species, *Cucurbitaceae* with three species, *Poaceae* and *Rutaceae* with 2 species each. The plant species with high rate of quotation mainly skin diseases were *Aloe barteri*, *Artemisia annua*, *Citrus aurantiifolia*, *Moringa oleifera*, *Vernonia guineensis* (Table 2).

The plant species encountered are used for 29 therapeutic preparations (Table 3). Thirteen recipes are monospecific, whether they are associated or not to the non-plants ingredients; it is the case of a preparation with *Leea guineensis*. Two recipes are made with 6 and 7 plant ingredients. The ample phytotherapeutic knowledge of the treatment of HIV/AIDS is shown by the high value of the average of citations of therapeutic preparations by 25 informants (4.72). It should be underlined that several plant species are used in a many preparations against the pandemic. Following the average of the preparations per plant (0.7) and the average of plants per recipe (1.4), this result indicates a substantial exploitation of the plant resources.

The index of flora usage (IU) presented by Noumi (2010) can be extrapolated from the present survey. Taking into account the fact that there are approximately 8000 plant species in Cameroon.

The IU of Mezam Division concerning HIV/AIDS is:  $(41/8000 \times 100) \times 0.7 = 0.35$  (the percentage of the 41 plant species on the figure 8000, multiplied by 0.7 (average of preparations by plant)).

**Table 2. List of plants used to treat HIV/AIDS, their botanical families, % of their quotations and the subsequent recipes**

Sl. No.	Families of plants used for treatment	Scientific name of plants	% Plant quotation according to 150 quotations by 25 informants	Local /current names	Subsequent recipes from the plants used for treatment (refer table 3)
1	<i>Acanthaceae</i>	<i>Acanthus montanus</i> (Nees) T .Anders.	6%	Funjonong (Bali)	1, 27
2	<i>Asteraceae</i>	<i>Ageratum conyzoides</i> L.	4.6%	Goat weed	23, 28
3	<i>Clusiaceae</i>	<i>Allanblakia floribunda</i> Oliv.	2%	Nsangomo	20
4	<i>Liliaceae</i>	<i>Allium sativum</i> L.	5.3%	Garlic	19, 21
5	<i>Liliaceae</i>	<i>Aloe barteri</i> Backer	13.2%	Aloe vera	2, 3, 4, 14, 15, 28
6	<i>Asteraceae</i>	<i>Artemisia annua</i> L.	13.8%	Warm wood	16, 17, 24, 25
7	<i>Asteraceae</i>	<i>Aspilia africana</i> (Pers) C.D. Adams	5.3%	african iodine	5, 27
8	<i>Acanthaceae</i>	<i>Asystasia vogeliana</i> Benth.	6.6%	Mabongo	23, 27, 28
9	<i>Asteraceae</i>	<i>Bidens pilosa</i> L.	4%	Blackjack	22, 27
10	<i>Chenopodiaceae</i>	<i>Beta vulgaris</i> L.	4%	beet root	21, 26
11	<i>Bombacaceae</i>	<i>Bombax buonopozense</i> P. Beauv.	2.6%	Esodum	6
12	<i>Brassicaceae</i>	<i>Brassica oleracea</i> L.	2%	Cabbage	29
13	<i>Caesalpiniaceae</i>	<i>Cassia alata</i> L.	2.6%	Ringworm bush	23
14	<i>Rutaceae</i>	<i>Citrus aurantiifolia</i> L.	9.8%	Lime fruit	14, 23, 24, 28
15	<i>Rutaceae</i>	<i>Citrus limonum</i> var. <i>dulcis</i> Risso et Poit.	4.6%	Lemon fruit	21
16	<i>Asteraceae</i>	<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	2%	Duigne	27
17	<i>Cucurbitaceae</i>	<i>Cucurbita maxima</i> L.	2.6%	Pumkin	15
18	<i>Cucurbitaceae</i>	<i>Cucurbita pepo</i> L.	7.3%	Egusi	24, 25, 26
19	<i>Poaceae</i>	<i>Cymbopogon citratus</i> stapf	6.6%	Fever grass	22, 25, 28
20	<i>Solanaceae</i>	<i>Datura stramonium</i> L.	3.3%	God garden	7
21	<i>Apiaceae</i>	<i>Daucus carotta</i> L.	2%	Carrot	29
22	<i>Agavaceae</i>	<i>Dracaena deisteliana</i> Engl.	2%	Fekok	27

Continue Table 2..

Sl. No.	Families of plants used for treatment	Scientific name of plants	% Plant quotation according to 150 quotations by 25 informants	Local /current names	Subsequent recipes from the plants used for treatment (refer table 3)
23	<i>Acanthaceae</i>	<i>Eremomastax speciosa</i> (Hochst) Ford	2%	Two-sidedleaf	27
24	<i>Myrtaceae</i>	<i>Eucalyptus saligna</i> L.	6.6%	Eucalyptus	8, 29
25	<i>Apiaceae</i>	<i>Foeniculum vulgare</i> (M.) Gaetner	2%	Fennel	29
26	<i>Caesalpiniaceae</i>	<i>Guibourtia tessmannii</i> (Harms) J. Léonard	4.6%	Essigang	18, 28
27	<i>Asteraceae</i>	<i>Helianthus annuus</i> L.	6.6%	Sun flower	22, 25, 26
28	<i>Malvaceae</i>	<i>Hibiscus rosa-sinensis</i> L.	2.6%	Hibiscus flower	24
29	<i>Leeaceae</i>	<i>Leea guineensis</i> G. Don	3.3%	Furkwang (Bali)	9
30	<i>Euphorbiaceae</i>	<i>Manihot esculenta</i> L.	2%	Cassava	10
31	<i>Sterculiaceae</i>	<i>Mansonia altissima</i> (A. Chev.) A. Chev.	2%	Bêté	20
32	<i>Moringaceae</i>	<i>Moringa oleifera</i> Lam.	10.5%	Horseradish	16, 17, 26
33	<i>Lamiaceae</i>	<i>Ocimum basilicum</i> L.	2%	Masepo(Bakweri)	29
34	<i>Apiaceae</i>	<i>Petroselinum hortense</i> Auct.	2%	Parsley	20, 29
35	<i>Combretaceae</i>	<i>Pteleopsis hylodendron</i> Mildbr.	6%	Sikon	11
36	<i>Brassicaceae</i>	<i>Raphanus sativus</i> L.	2%	Radish	29
37	<i>Combretaceae</i>	<i>Terminalia superba</i> Engl. & Diels	2.6%	Akom	18
38	<i>Asteraceae</i>	<i>Vernonia guineensis</i> Benth .	9.3%	guinean ginseng	19, 26, 28, 29
39	<i>Poaceae</i>	<i>Zea mays</i> L.	2%	Maize	26
40	<i>Cucurbitaceae</i>	<i>Zehneria scabra</i> (L.f) Sond.	4.6%	Lambeket (Bali)	12, 13
41	<i>Zingiberaceae</i>	<i>Zingiber officinalis</i> L.	2%	Ginger	29



**Table 3. Different therapeutic recipes, the ingredients used and the method of preparation and administration**

Recipes number	Plant species, plant part used	Mode of use
Total recipes = 29	Total plant species = 41 Total medicinal plant species in all recipes = 59 Total plants/recipes = 1.4 (59/41)	Total of medicinal preparations = 29 Average of medicinal preparations per plant (AMP) = 29/41 = 0.7
Total informants = 25	Not plant ingredients : honey, local rum or hâ, rock salt	Qs = quantum satis (Latin) monospecific recipes = 13, dispecific recipes = 6 Method of preparation : decoction, infusion, maceration Mode of administration : oral route, rubbing, poultice,
1	<i>Acanthus montanus</i> : 2 leaves chopped up	The leaves are boiled in 1L of water for 15 min and the solution drunk: 1 glassful 3 times a day. Precaution: New decoction is prepared each day.
2	<i>Aloe barteri</i> : 250 mL of leaves	The leaves ridded of thorns are ground in a paste, consumed, ½ glass morning and evening. <u>Remark:</u> The patients reported that the preparation cause the disappearance of the pimples on their bodies.
3	<i>Aloe barteri</i> : leaves and roots	The gel of leaf is rubbed on the affected part of the body or the paste of roots is used as poultice to treat ringworm, 3times a day.
4	<i>Aloe barteri</i> : 250 mL of leaves in paste *honey: 250 mL	The ingredients are mixed and the solution drunk: 2 spoonfuls; 30 min before the meal, 3 times per day. <u>Remark:</u> The patients reported that the preparation cause the disappearance of the pimples on their bodies.
5	<i>Aspilia Africana</i> : 2 handfuls of roots	The roots are boiled in 1L of water for 15 min and the cooled decoction drunk: 1 glassful, 3 times a day for patients with tuberculosis.
6	<i>Bombax buonopozense</i> : 500 g of pounded stem bark *honey: 6 tablespoonfuls *drink: Tonic not put to chill: qs 1.5L	The ingredients are mixed, homogenized and the solution drunk: 1 glassful morning and evening after the meal. <u>Remark:</u> The bottle must be well closed
7	<i>Datura stramonium</i> : 3 fruits	The fruits are roasted and squeezed to obtain juice rubbed on areas affected with herpes zoster or rash.

Continue Table 3.....

Recipes number	Plant species, plant part used	Mode of use
8	<i>Eucalyptus saligna</i> : leaves powdered *palm oil	One tablespoonful of powder is turned in 2 tablespoonfuls of palm oil and the mixture swallowed, 2 times a day to treat associated tuberculosis.
9	<i>Leea guineensis</i> : 5 young leaves ground *kitchen salt: a pinch *wood ash: 1 tablespoonful	The ingredients are mixed and rolled in small lumps chewed with water or oil 3 times a day for patients with diarrhea.
10	<i>Manihot esculenta</i> : half a glassful of leaf juice * no sweetened milk : half a glassful	The ingredients are mixed and the gotten solution drunk: 1 glassful after the meal, morning and evening.
11	<i>Pteleopsis hylodendron</i> : 0.5 kg stem bark	-The pounded stem barks are boiled in 3L of water for 15 min and the cooled decoction is drunk: 1 glassful twice a day. -The same solution is used to rub the body part affected by herpes zoster and kaposi's sarcoma, with quick and good result.
12	<i>Zehneria scabra</i> : 15 fresh leaves	The fresh leaves are pounded and used as poultice on the skin affected with herpes zoster once a day.
13	<i>Zehneria sca15bra</i> : 1 handful of leaves *palm wine: 1L16	-The cut-up leaves are macerated in the palm wine for 1-3 days and the tincture drunk: 1 glassful 3 times a day for 1 week. -The chaffs of the plant materials is used to clean the body infected with herpes zoster and after, rub the affected area with tincture from <i>Zehneria scabra</i> leaves.
14	- <i>Aloe barteri</i> : 250 mL of leaves in paste - <i>Citrus aurantiifolia</i> : juice of 4 fruits *honey: 700 mL *whisky : 50 mL	The ingredients are mixed and crushed in a fine cream, drunk: 0.5L 30 min before the meal 3 times a day. <u>Remark:</u> The patients reported that the preparation cause the disappearance of the pimples on their bodies.
15	- <i>Aloe barteri</i> : 3 leaves ground in paste - <i>Cucurbita maxima</i> : juice of 5 leaves	The 2 ingredients are mixed and the mixture drunk: half a glassful 3 times a day.
16	- <i>Artemisia annua</i> : 1 handful of leaves powdered - <i>Moringa oleifera</i> : 1 handful of seeds powdered	A tablespoonful of each powder is added in 1L of water and the mixture boiled for 5 min. The cooled solution is drunk: 1 glassful 3 times a day.
17	- <i>Artemisia annua</i> : 1 handful of leaves - <i>Moringa oleifera</i> : 2 handfuls of leaves * Palm wine: 1L.	All the chopped up leaves are macerated in the palm wine for 1-2 weeks and the tincture drunk: half a glassful 3 times a day.

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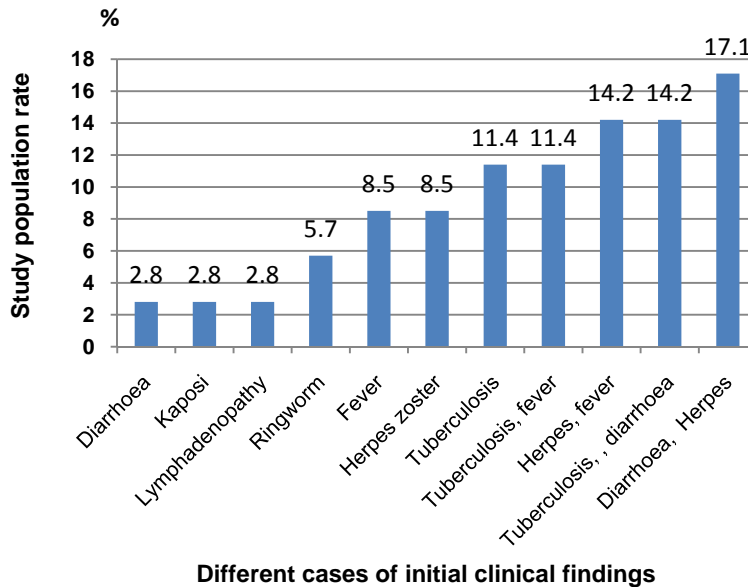
Recipes number	Plant species, plant part used	Mode of use
18	- <i>Guibourtia tessmannii</i> : 500 g stem bark - <i>Terminalia superba</i> : 500 g stem bark	The ingredients are boiled in 5L of water for 30 min and the cooled solution is drunk: 1 glassful 3 times per day.
19	- <i>Allium sativum</i> : ground 1 clove of garlic in paste - <i>Vernonia guineensis</i> : 5 tubers powdered *honey: 1 tablespoonful	<i>Vernonia guineensis</i> and <i>Allium sativum</i> are mixed, then 1 teaspoonful mixture added in 1 tablespoonful of honey and the paste swallowed, 3 times a day.
20	- <i>Allanblakia floribunda</i> : 1 kg stem bark - <i>Mansonia altissima</i> : 1 kg stem bark - <i>Pteleopsis hylodendron</i> : 1 kg stem bark	The ground stem bark is boiled in 5L of water for 30 min and the cooled solution drunk: 250 mL after the meal morning and evening.
21	- <i>Allium sativum</i> 1 clove of garlic ground - <i>Bixa aurellana</i> : 2 tubers ground - <i>Citrus limonum</i> : peelings of 2 fruits	The peelings and tubers are boiled in 2L of water for 15min. The decoction cooled and strained is added with the ground clove and the mixture drunk: 1 glassful 2 times a day.
22	- <i>Bidens pilosa</i> : ten leafy plants - <i>Cymbopogon citratus</i> : 1 handful of leaves - <i>Helianthus annuus</i> : ten leaves	The plant elements are boiled in 2 L of water for 15 min and the cooled decoction drunk: 2 glassfuls 2 times a day.
23	- <i>Ageratum conyzoides</i> : 1 handful of leafy plants - <i>Asystasia vogeliana</i> :1 handful of leafy plants - <i>Cassia alata</i> : 1 handful of leaves - <i>Citrus aurantiifolia</i> : 5 fruits chopped up	The ingredients are boiled in 3L of water during 15 min and the cooled decoction drunk: 1 glassful 2 times per day.
24	- <i>Artemisia annua</i> : a handful of leaves, - <i>Citrus aurantiifolia</i> : 2 fruits - <i>Cucurbita pepo</i> : 5 leaves - <i>Hibiscus rosa-sineensis</i> : 5 leaves	The ingredients chopped up and pounded or macerated in 3L of water for 6 h and the maceration drunk: 1 glassful 3 times a day.
25	- <i>Artemisia annua</i> : 1 handful of leaves - <i>Cucurbita pepo</i> : 5 leaves - <i>Cymbopogon citratus</i> : 1 handful of leaves - <i>Helianthus annuus</i> : 5 leaves *whisky: 2L	All the chopped up leaves are macerated in the whisky for 2-3 weeks and the tincture drunk: half a glassful 2 times a day.
26	- <i>Beta vulgaris</i> : 3 large roots - <i>Cucurbita pepo</i> : 1 glassful of seeds - <i>Helianthus annuus</i> : half a glassful of seeds	The ingredients are dried and powdered, and 2 tablespoonfuls of the above powder added in the pap before taking it, 2 times a day.

Continue Table 3.....

Recipes number	Plant species, plant part used	Mode of use
27	<ul style="list-style-type: none"> <li>-<i>Moringa oleifera</i>: 1 glassful of seeds</li> <li>-<i>Vernonia guineensis</i>: 2 tubers</li> <li>-<i>Zea mays</i>: 1 glassful of grains</li> <li>-<i>Acanthus montanus</i>: 2 handfuls of leaves</li> <li>-<i>Aspilia Africana</i>: 2 handfuls of leaves</li> <li>-<i>Asystasia vogeliana</i>: 2 handfuls of leaves</li> <li>-<i>Bidens pilosa</i>: 2 handfuls of leaves</li> <li>-<i>Crassocephalum crepidioides</i> : 2 handfuls of leaves</li> <li>-<i>Dracaena deisteliana</i> : 2 handfuls of leaves</li> <li>-<i>Eremomastax speciosa</i> : 2 handfuls of leaves</li> </ul>	The ingredients are boiled in 10L of water for 45 min and the cooled decoction drunk: 1 tablespoonful two times per day.
28	<ul style="list-style-type: none"> <li>-<i>Ageratum conyzoides</i> : 1 handful of leaves</li> <li>-<i>Aloe barteri</i>: leaves in paste</li> <li>-<i>Asystasia vogeliana</i>: 1 handful of leaves</li> <li>-<i>Citrus aurantiifolia</i> : 500 g of fruits</li> <li>-<i>Cymbopogon citratus</i> : 1 handful of leaves</li> <li>-<i>Guibourtia tessmannii</i> : 500 g stem bark</li> <li>-<i>Vernonia guineensis</i> : 1000 g of tubers</li> </ul>	<ul style="list-style-type: none"> <li>-<i>Aloe barteri</i> except, the other ingredients are boiled in 8L of water during 30 min and the cooled solution drunk: 1 glassful 3 times per day.</li> <li>-Every time, 1 glassful of <i>Aloe barteri</i> paste is drunk.</li> </ul>
29	<ul style="list-style-type: none"> <li>-<i>Brassica oleracea</i> : 1 handful of leaves</li> <li>-<i>Daucus carotta</i> : 1 handful of leaves</li> <li>-<i>Eucalyptus saligna</i>: 1 handful of leaves</li> <li>-<i>Foeniculum vulgare</i>: 1 handful of leaves</li> <li>-<i>Ocimum basilicum</i>: 1 handful of leaves</li> <li>-<i>Petroselinum hortense</i>: 1 handful of leaves</li> <li>-<i>Raphanus sativum</i>: 1 handful of leaves</li> <li>-<i>Vernonia guineensis</i>: 1 handful of leaves</li> <li>-<i>Zingiber officinalis</i>: 1 handful of rhizome</li> <li>* wine of palm or raffia: 5L</li> </ul>	The crushed leaves are introduced in a container and the volume is completed to 5L with the palm wine or raffia wine. The preparation is infused for 5 days and the tincture drunk: 1 glassful 2 times per day.

#### 4.1.3 Outcome from the patients

With the help of traditional healers, we met 35 patients undergoing treatment who accepted to participate in the study. A total of 5 patients used only the antiretroviral treatment, 5 other said they used both forms of treatment, i.e., biomedical and traditional, while the others used only the traditional medicines. At the onset, 60% of patients had more than one clinical infection (Figure 2).



**Fig. 2. Initial clinical findings from 35 patients of HIV/AIDS (increasing study population rate)**

The patients with single manifestations on entry seemed to be more favorable to treatment, as compared with people with multiple manifestations. Skin diseases were easily treated by many recipes. Herpes zoster, rash or kaposi's sarcoma (figures 3, 4) were treated by preparations of *Aloe barteri* (Figure 5), *Datura stramonium*, *Microglossa pyrifolia*, *Pteleopsis hylodendron* and *Zehneria scabra*. Tuberculosis was easily treated by using the preparation with *Eucalyptus saligna* and diarrhoea with *Lea guineensis* (Figure 6) preparations.

At the end of the field trips ten patients became symptom-free, using 1-3 numbers of traditional healers. At the hospital, their examinations gave the CD4 rates superior to 350 cells/ $\mu$ L. These symptom-free ten patients used 22 medicines including 2 ARVs (Table 4). The mostly used recipes are recipe no. 7 with *Datura stramonium*, and recipe no. 15 with *Aloe barteri* and *Cucurbita maxima*. The preparations totalize 34 ingredients (ARV: 5.8%; honey and palm wine, 14.7%; plant species, 85.2%). Among the plant species the mostly used plants were *Aloe barteri*, *Datura stramonium*, and *Zehneria scabra* was also mainly employed for skin diseases.



**Fig. 3.** Kaposi's sarcoma (opportunistic infection) is a tumor caused by human herpes virus 8 (HHV8), also known as kaposi's sarcoma associated herpes virus (KSHV). Kaposi's sarcoma lesions are nodules or blotches found on the skin. Commonly affected areas include the lower limbs, the back, the face, the mouth and genitalia. The eruption started on the legs and won the patient's whole body progressively.



**Fig. 4.** Kaposi's sarcoma, opportunistic infection, undergoing treatment with medicinal plant preparations



**Fig. 5. Whole plant of *Aloe barteri* Baker (*Liliaceae*) with thorny leaves**



**Fig. 6. Leafy branches and inflorescences of *Leea guineensis* G. Don (*Leaceae*)**

**Table 4. Pattern analysis of 35 patients**

Patient number	Age (years)	Duration of illness (months)	Duration of treatment (months)	Period after recovery (months)	Recipe used	Test results in hospital
1	29	24	8	12	7, 24	-
2	17	6	1		1, ARV	+
3	37	36	6	14	7, 11, 13	-
4	32	9	10	22	1, 4, 7	-
5	31	24	18		14, ARV	+
6	42	12	4		ARV	+
7	27	12	3		2, 3	+
8	26	3	18		11, ARV	+
9	33	8	3		ARV	+
10	30	15	5		ARV	+
11	22	24	8		2, 5, 9	+
12	41	36	22		2, 13, 19	+
13	16	12	9		2, 3	+
14	38	12	4		ARV	+
15	25	6	6	16	2, 7, ARV	-
16	70	12	12	24	7, 19, ARV	-
17	28	3	7	20	2, 4, 13	-
18	22	12	6		8, 28, ARV	+
19	35	24	3		ARV	+
20	18	12	8		25, ARV	+
21	37	6	7	5	12	-
22	32	36	6	8	15, 21	-
23	31	12	8	8	15	-
24	42	6	7	16	6	+
25	27	6	7	13	15	-
26	26	60	9			+
27	33	12	7			+
28	30	6	8			+
29	22	12	12			+
30	41	12	16		12, 27	+
31	16	7	7		18, 26	+
32	38	12	7		22, 26	+
33	25	12	16		13	+



34	70	12	9	26	+
35	28	8	10	12, 22	+

+ = seropositive, - = symptom-free

### 3.2 Discussion

The epidemiology shows that the HIV/AIDS pandemic is well present in Mezam Division, North-West Cameroon, and that the women are the most affected. They are vulnerable because the collar of the uterus is more sensitive to lesions (anonymous ICASO, 2000), coupled with the fact that sexual intercourse is not always protected.

The study of medicinal plants with anti-HIV/AIDS properties permitted us to identify forty-one species belonging to 39 genera and 23 families. The data showed that some of the therapeutic uses found are strictly local or not frequently reported in the Cameroonian area. On the one hand, in the Mezam Division, the peculiarities of phytotherapy may be attributed to cultural stratification resulting from different waves of domination: the German one (1884-1918) and the British one (1919-1961).

Many species are being introduced for a century as spices (*Allium sativum*, *Ocimum basilicum*, *Petroselinum hortense* and *Zingiber officinalis*) (Noumi, 1984), remedy for malarial fever (*Artemisia annua* and *Cymbopogon citratus*), diuretic and food (*Zea mays*) (Bruni et al., 1997). Now-a-days, members of different health NGOs have introduced *Foeniculum vulgare*, galactagogue (Audra and Guedes, 1977), *Helianthus annuus*, for the prevention of cardiovascular disorders (Gotor, 2008). It is worth noting that these plant species are here employed as anti-HIV/AIDS products or for HIV/AIDS-related illnesses. On the other hand, species used to treat HIV/AIDS or HIV/AIDS-related illnesses have been mentioned in other African areas for the same gold: *Helianthus annuus* in South Africa (Malangu, 2007), *Ageratum conyzoides* and *Pteleopsis hylodendron* in the Cameroon forest (Ngono et al., 2011). These facts reinforce their credibility for the treatment of HIV/AIDS. In the Mezam Division, original uses have been found for *Zehneria scabra* (as poultice), *Datura stramonium* (as external lotion) for herpes zoster or rash, *Eucalyptus saligna* (as leaf powder), *Aspilia Africana* (as root decoction) for associated tuberculosis, and *Leea guineensis* (as lumps to chew) for opportunistic diarrhea.

The data presented provide two observation parameters:

- 1) The plants which have a high number of citations or preparations. In this case, the ongoing socio-historical validation, establishing the relationship between plant and disorder (HIV/AIDS in the present study), is more advanced: *Aloe barteri* (13.2% of citations per plant, 6 recipes); *Artemisia annua* (13.8%, 4 recipes); *Citrus aurantiifolia* (9.8%, 4 recipes); *Moringa oleifera* (10.5%, 3 recipes) and *Vernonia guineensis* (9.3%, 4 recipes). Hence, it appears that there is a remedy's cultural transition from popular phytotherapy into modern drug. One sample of this is the use of the leaves of *Aloe barteri*. Its excerpts have the faculty to inhibit the reproduction of the inverse transcriptase and the proliferation of the virus (Anonymous, 2004).
- 2) The recipes which have a high number of plants should be more efficient. It is the conviction of the traditional healers facing the so-called traditional or modern illnesses, such as HIV/AIDS. According to that point of view, the active principles mutually reinforce their capacities to treat a given disease.

These two parameters are taken together in this ethno-pharmacological study within a community like that of the Mezam Division.

Some plants treating HIV/AIDS opportunistic infections include *Zehneria scabra* (the whole plant), which treats skin eruption: herpes simplex, meningitis, mouth candidose, (Kisangau et al., 2007; Teklehaymanot and Giday, 2007; Kisangau et al., 2007); *Citrus limonum* treats herpes simplex and tuberculosis (Kisangau et al., 2007). In the *Aloe barteri*, the anthranol and anthracene fix the dioxygen; the emodine of *Aloe* is a bactericidal and laxative. The cinnamic acid is detergent, germicidal and fungicide; the chrysophanic acid is a fungicide (cutaneous mushrooms); the aloemannan and acemannan reinforce the immune system. The presence of the chrysophanic acid in different parts of *Cassia alata* plays an extra role against dermatosis (Maurin, 1927). A previous survey established the relation between anti-HIV products and insecticides (Noumi and Anguessin, 2010), thus, confirming the use for example of *Artemisia annua* and *Moringa oleifera* in the treatment of HIV/AIDS. These two plants species are also insecticides (Akhtar et al., 2007; Zhang et al., 2009).

Chemistry and pharmacology confirm the efficiency of the recipes used. The flavonoides inhibit the replication of the inverse transcriptase of the HIV-1 and, therefore, the infection by the said virus (Anonymous, 2001). The chemical compounds, such as flavonoides, triterpenes, sulfamides, coumarine, alkaloids, proteins and the peptides, have complementary mechanisms of action and antiviral effects inhibiting the proliferation of HIV (Jassim and Naji, 2003). The antioxidants (as vitamins C and E) neutralize the free radicals (very active molecules that can damage the organism). They are important in medicinal plants like *Aloe barteri*, *Moringa oleifera* and *Zingiber officinale*. *Leea guineense* leaves yield antioxidant flavonoid and phenolic acids (de Beck et al., 2003).

The Usage Index (UI) of the plant species used for the treatment of prostatic diseases in the Mezam Division is estimated at 0.35. It is also important than the abortion-related UI found in the Buea area (UI = 0.33) (Noumi and Njeumen, 2007), but lower than the one for the treatment of prostatic troubles in Fouban (0.83) (Noumi, 2010). Several plant species are largely used in preparations for the treatment of prostatic illnesses, with a coefficient of 1.4 plant species by recipe. It is lower than the one reached in Fouban concerning prostatic diseases treatment. This result indicates a good use of the phytotherapy resources to reduce those illnesses. Ten out of over 35 patients (28.5%) have got well (Table 4, last column) after using the preparations or combination of preparations from 8 traditional healers. Among them, 4 patients were treated using the recipe 15 (refer table 3) from the traditional healers. The potential efficiency of some local recipes using medicinal plants is put in evidence.

Some of the plant species have side effects: *Hibiscus rosa-sinensis* is abortifacient (Noumi and Djeumen, 2007) and *Datura stramonium* is a poison (Noumi, 2004). They have external uses and are efficient like other plants species against skin opportunistic diseases. Meanwhile, they should be used under the control of traditional healers (Kerarho and Adam, 1974).

#### 4. CONCLUSION

The average medicinal preparation per plant (0.70) is low in spite of the fact that 55% of recipes are multi-specific. The average plant per recipe, 1.4, shows the effort of traditional healers to give potentiality to the active principles by mixing many plants in the recipes, while reinforcing their capacity to cope with the disease. Taking two or more antiretroviral drugs at a time is called combination therapy, which is referred to as Highly Active Antiretroviral

Therapy that reduces the rate at which resistance would develop, making treatment more effective in the short- or long-term. The aim of this research work was to determine whether the medicinal plants used to combat HIV/AIDS and its opportunistic diseases could effectively yield fruit. Our findings show some efficiency especially in terms of eliminating the symptoms of HIV/AIDS and the treatment of the HIV/AIDS-related illnesses. The main limitation of this research, however, may be used as a direction for future research, which is, assessing the results from the field at the chemical level in laboratories.

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