



## Research paper

## Ethnobotanical survey of medicinal plants used for pregnant women's health conditions in Menoua division-West Cameroon



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## ABSTRACT

**Ethnopharmacological relevance:** In Cameroon, most women use traditional medicine for the treatment of pregnancy and childbirth complaints. In order to identify some of the medicinal plants locally used to alleviate these complaints, an ethnobotanical survey was undertaken in five villages of Menoua Division (West-Cameroon).

**Materials and methods:** Interviews were conducted through structured questionnaires among 24 traditional healers and 179 women living either in the town of Dschang or in 4 neighboring villages. After having recorded the interviewee personal information on issues related to medicinal plants utilization, a literature investigation on their therapeutic or pharmacological effects and phytochemical composition was conducted.

**Results:** A total of 88 medicinal plants species used to treat 24 conditions occurring during or after pregnancy and belonging to 70 genera or 34 families were recorded. Maximum medicinal uses of plants are reported for the treatment of the following ailments: swelling of legs and ankles (23%), facilitation of delivery (22%), cleaning of the baby (12%). Most herbal remedies are prepared with the leaves (30%), leaves+stems (28%) and whole plant (23%) as maceration (76%). The majority of women who used medicinal plants were very satisfied (75 %) and it is reported that most of these plants are used in the treatment of women health conditions.

**Conclusion:** Many herbal remedies used for the treatment of pregnant women's health conditions in Menoua division-West Cameroon have been revealed. It would therefore be judicious for our government and research institution to evaluate the therapeutic and toxicological potentials of these plants in order to valorize their use.

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## 1. Introduction

Pregnancy, in majority of cases, is accompanied by mild complaints. However, these complaints can induce in some cases serious complications which may have deleterious consequences on mother and baby health and eventually lead to their death.

Every year, more than five hundred thousand women and four million new-born babies aged less than 1 month die following health complications related to pregnancy or childbirth (OMS, 2005; UNICEF, 2008). The majority of these deaths are recorded in Africa where one woman out of twenty one finds death (N'Guessan, 2000). In Cameroon, this trend is among the highest

in the world as one woman and six newborn babies die every 2 h from complications related to pregnancy and child-birth (Mbouzeko, 2009). To resolve some of these procreation complications, modern medicine has developed various treatments (cesarean, chemotherapy, etc.) which cost is prohibitive and limits their accessibility.

There is indeed a close link between poverty and risky pregnancy, as 99% of world-death cases quoted above occur in developing countries (Sub-Saharan Africa and South Asia) (OMS, 2007). Moreover, the teratogenic susceptibility of the first term pregnancy and the side effects generated by synthetic drugs have dramatically limited the use of modern medicine during the pregnancy, thus favoring the return to phytotherapy (Pinn and Pallett, 2002).

Today, about 80% of the world's population use phytotherapy as a source of medication (Zava et al., 1998). For all aspects of woman

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reproductive health issues (menstruation, conception, pregnancy, lactation and menopause), a great number of plants species were used and continue to be used, by women and tradipractitioners all over the world (STUART, 2004). However, majority of these plants have not been investigated (Deciga-Campos et al., 2007).

In Cameroon, no study, to our knowledge, has been undertaken on medicinal plants used for the treatment of ailments occurring during childbearing. Thus the present proposal, which aims at carrying out an inventory of medicinal plants used for the treatment of childbearing ailments in some localities of the Menoua division (Western Region of Cameroon).

## 2. Materials and methods

### 2.1. Study area

Menoua division is one of the eight (8) divisions of West Region in Cameroon and its capital is Dschang. It covers an area of 1380 km<sup>2</sup>. In 2001, its total population was estimated at 372,244 (Departments of Cameroon, 2004). This population is made up of the Bamileke tribe and their main activity is agriculture and animal rearing.

The Division is geographically located between 5.00° to 5.50° latitude north and 9.40° to 10.25° longitude east on the map of the world. This division spreads from Santchou (altitude 600 m) to the Nkong-Ni (Djuttitsa) plateau at an altitude of 2200 m. The climate is tropical-cold in a large part of the division and comprises two distinct seasons: a dry season from mid-November to mid-March and a rainy season which extends from mid-March to mid-November. Average annual temperatures (from 1997 to 2006) were 25.35 °C (maximum) to 13.66 °C (minimum) and the average annual rainfall for the same period was 1717.70 mm (Seino et al., 2013).

Menoua Division is administratively divided into 6 subdivisions (Dschang, Fokoue, Fongo-Tongo, Nkong-Nhi, Penka-Michel and Santchou) and subdivided into 22 villages. However, the study area includes Dschang town and four villages: Baleveng (Nkong-Nhi), Bamendou (Penka-Michel), Fongo-ndeng (Dschang), Fontsa-toula (Fokoue) (Fig. 1).

### 2.2. Data collection

An ethnobotanical survey took place from April 2010 to November 2010 and it included two hundred and three people aged between 18 and 90 years. These people were women having been pregnant at least once, tradipractitioners or traditional obstetricians. They were interviewed according to a questionnaire which was previously drawn up and comprised: the number of pregnancies already carried, the number of children; types of medication (medicinal plants or pharmaceutical products) used during the pregnancy; and for each medicinal plant used its vernacular name, medical use, part used during the preparation, mode of preparation, route of administration, the solvent used, the dosage, the length of treatment and consumer's degree of satisfaction relatively to each treatment they were following. Interviews were conducted on the field during collection trips and after examination and seeking oral consent from informants, fresh plant specimens were collected, dried and stored in the laboratory of the Department of Biochemistry of the Faculty of Science of the University of Dschang. They were later identified at the Cameroon National Herbarium Yaounde where their full scientific names and voucher number were obtained. Further literature investigations were also conducted relatively to their therapeutic and/or pharmacological effects and their phytochemical composition.

### 2.3. Data analysis

Descriptive statistic was principally used in this study. Initially, the information about the popular uses of the species collected, along with botanical information, was compiled into a database. The species were listed in alphabetical order by family, scientific name, popular name in the region (vernacular name), voucher number and frequency of use. The frequencies of observations of plants were calculated as the sum of their utilizations among the questionnaires given to healers. The frequency of citation (FC) of the used plant species was evaluated using the following formula:  $FC = (\text{number of times a particular species was mentioned} / \text{total number of times that all species were mentioned})$ .

## 3. Results and discussion

### 3.1. Demographic characteristics of informants

From Table 1 it is noted that two hundred and three (203) persons were interviewed among which 12% were traditional healers, 1% traditional birth attendants and 87% women who have been pregnant at least once. These disparities could be due to the fact that traditional healers are scarce throughout our country and thus represent a very little portion of the general population. Indeed, young people to whom traditional knowledge on medicinal plants effects could have been transmitted are not eager to it and exile to city for jobs and better living condition purposes.

Dschang town and Bamendou village had the highest numbers of people who participated in the inquiry. In contrary to most of the village's inhabitants, those of Dschang were most receptive. However, the exceptional high number of Bamendou inhabitant involved in the survey may be due to the fact that most investigators were native of this village.

### 3.2. Different plant species recorded

The ethnobotanical survey permitted the sampling of 88 plants species, belonging to 70 genera and 34 families. The most represented family was Asteraceae, with 8 species belonging to 6 genera, followed by Malvaceae and Solanaceae families each having 5 species belonging to 3 and 2 genera respectively (Table 2).

The high number of medicinal plants obtained from the Asteraceae family may be either due to the wide range of biologically active compounds present in that family, or because it is one of the largest families in the plant kingdom (Heinrich et al., 1998; Thomas et al., 2009). It could also be attributed to the similarities of traditional knowledge on pregnancy complaints treatment with medicinal plants by people living in the study area (Telefo et al., 2011) or to the assumed efficacy of medicinal plants as reported by the informants.

The preferential use of shrubs and herbs for medicinal purposes could be attributed to their availability coupled to their higher effectiveness in the treatment of ailment in comparison to other growth forms. Contrary to trees, the growth of shrubs and herbs are favored in grassland savannah which is our study area location (Tsobou et al., 2013). The common use of shrubs and herbaceous medicinal plants was also reported in other parts of the world (Addo-Fordjour et al., 2008) and attributed to their wide range of bioactive ingredients (Gazzaneo et al., 2005).

The frequencies of citation of plants recorded during the survey are also illustrated in Table 2. From this table, ten of these plants (*Aloe buttneri*, *Cymbopogon citratus*, *Crassocephalum bauchieuse*, *Sida veronicifolia*, *Nelsonia canescens*, *Hibiscus noldea*, *Aframomum letestuanum*, *Crassocephalum bauchieuse*, *Ipomoea tenuirostris*,

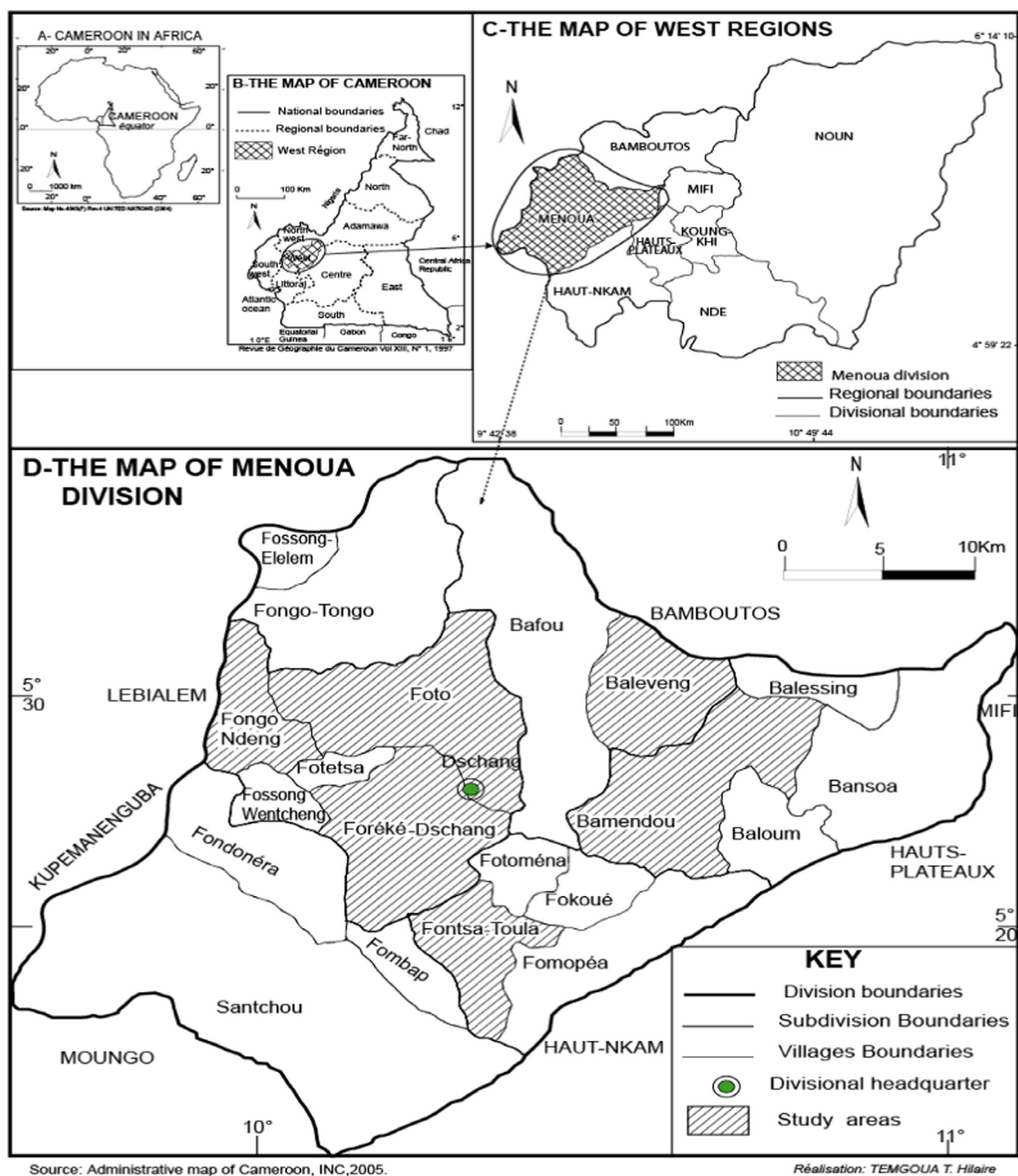


Fig. 1. Map of Menoua Division.

*Commelina benghalensis* and *Ageratum conyzoides*) presented higher frequencies of citation. This may be linked to their efficacy since eight of these most frequent plants are reported, in Cameroon as well as in other parts of the world, to be used for the treatment of the same ailments. Indeed, ethnobotanical surveys in many Cameroonian localities reported that *Cymbopogon citratus* is used for the treatment of swelling of legs and malaria while *Sida veronicifolia*, *Hibiscus noldeae* and *Nelsonia canescens* are used for the facilitation of delivery (Adjahoun et al., 1996; Focho et al., 2009b). Relatively to pain, many of the above plants are used for

its alleviation namely: *Cymbopogon citratus*, *Sida veronicifolia* (Focho et al., 2009a, 2009b; Pandey et al., 2009), *Crassocephalum bauchieuse* (Taiwe et al., 2012), *Commelina benghalensis* (Deyuan and Robert, 2000; Mollik et al., 2010), *Nelsonia canescens* and *Aloe buttneri* (Owoyele et al., 2006; Focho et al., 2009a, 2009b; Jiofack et al., 2010). These traditional knowledge on the therapeutic effects of the above medicinal plants are confirmed by various pharmacological studies data which demonstrated the analgesic effect of *Nelsonia canescens* (Owoyele et al., 2006); the inductive effect of *Aloe buttneri* on uterin muscle contractility (Guemo,



**Table 1**  
Distribution of informants according to their social position, sex and villages.

Villages	Selected informants			Gender		Total
	Tradi- practitioners	Traditional obstetricians	Women at least once pregnant	Male	Female	
Baleveng	2	0	23	2	23	25
Bamendou	13	3	39	9	46	55
Dschang	3	0	61	0	64	64
Fongo- Ndeng	4	0	24	3	25	28
Fontsa- Touala	2	0	29	1	28	31
<b>Total</b>	<b>24</b>	<b>3</b>	<b>176</b>	<b>15</b>	<b>188</b>	<b>203</b>
<b>Percentage (%)</b>	<b>12</b>	<b>1</b>	<b>87</b>	<b>7</b>	<b>93</b>	

2002), the diuretic effect of *Commelina benghalensis* (Mollik et al., 2010) and the analgesic, diuretic and antimalarial effects of *Cymbopogon citratus* (Shah et al., 2011).

### 3.3. Parts of plant used, mode of preparation and administration

Data on the parts of plant used for the various preparations showed that leaves, roots, stems, whole plant, fruits, seeds and barks are listed; but the most commonly used plant parts were the leaves (30%), followed by leaves+stems (28%) and whole plant (23%) (Fig. 2). In fact, leaves are known to accumulate plants secondary metabolites such as alkaloids, tannins and inulins, which are active components responsible for many medicinal properties (Husain, 1988; Okoegwale and Omezezi, 2001; Focho et al., 2009a). Moreover, utilization of leaves and stems is advantageous for the survival of plants since their harvest does not induce the irreversible destruction of plants like that of roots or whole plant (Telefo et al., 2012). The same results were obtained by Tuttolomondo et al. (2014) and they were attributed to the easiness of leaves collection in nature and their abundance in comparison with other plant organs.

Some medicinal plants are taken directly as they are harvested (i.e without preparation) (7%) or prepared in different forms including maceration (76%), decoction (15%) and calcination (2%). These preparations are made in water (85%), palm oil (3%), palm-oil traditional soup (2%), palm wine (2%) and mostly administered either orally (91%) or through the rectum (4%) (Fig. 2).

These modes of preparation and administration are the most used in traditional medicine. Similar results were obtained in previous ethnobotanical surveys carried out in Cameroon and other part of the world (Focho et al., 2009b; Telefo et al., 2011; Telefo et al., 2012; Embeya et al., 2014).

The duration of the treatment period was highly variable and ranges from 1 day (21%) to 6 months (11%). Also, the amount of preparations to be administered was variable and range from half-glass per day (12%) to unlimited (25%). Globally, the highest frequency of administration was 2 glasses per day (44%). This later data is in conformity with commonly used drug administration posology either with traditional or modern medicine.

Given the fact that few and even no toxicological information are available for many of the recorded medicinal plants, more attention should be paid on some treatment indications notably those requesting longer period (6 months) of administration of unlimited amount of preparations or recipes. Indeed, it is proven that plant extracts or some of their metabolites can be toxic for human being. For example, studies on *Senna alata* and *Rauvolfia vomitoria* have shown that the former contains mutagens while the later has teratogenic potential on fetal heart (Eluwa et al.,

2010; Hong and Lyu, 2011). Moreover, many of these plants have various ethnopharmacological effects (Table 4), which can negatively influence the outcome of pregnancy in case the administered doses, or duration of treatment is not controlled. Such is the case of *Sida veronicifolia* and *Senna alata*, which have been proven to have abortifacient properties (Lutterodt, 1988; Yakubu et al., 2010).

### 3.4. Different recipes and their medical use

Table 3 shows the different recipes and diseases associated. Among the 122 recipes obtained, 90 (74%) were made by using one plant, 18 (15%) with a mixture of two plants, 12 (10%) with three plants and 2 (2%) with four plants. Similar trend was obtained in other part of the world (Roosita et al., 2008). Recipes prepared with more than one medicinal plant is a common practice in our traditional medicine milieu and could be justify by the fact that, the combined use of medicinal plants in recipes may improve the synergistic or additive effects of their constituents (Igoli et al., 2005).

The recipes are used to cure one (70%), two (15%), three (11%) or several complaints (3%). Moreover, 86% of the recipes used to treat more than one ailment are made with only one medicinal plant. This could be attributed to the fact that, a single plant can contain many compounds which perform different functions in the body (Focho et al., 2009b).

The distribution of different recipes in function of pregnancy complaints or childbirth ailments is reported in Table 4. It shows that 24 pregnancy complaints or childbirth ailments were encountered and the most mentioned diseases treated in decreasing order of magnitude were swelling of legs and ankles (23%), facilitation of delivery (22%), cleaning of the baby (12%). The large number of complaints obtained demonstrates the effectiveness of difficulties endured by women during the pregnancy. Although, conventional medicine offers treatments for about 20 of these complaints, some of the most frequent ones (swelling of legs and ankles, cleaning of the baby) as well as many others (enlargement of the fetus, bad positioning of the baby, evil spirit) are not treated by it. This may explain the high frequency of these particular complaints among the interviewees. Indeed, the gynecologist only option for one of such ailments (bad positioning of the baby) would be surgical intervention which cost is not always affordable for the majority of our population. They usually go to traditional birth attendant who, with the help of concoctions prepared from medicinal plants, would reposition the fetus or baby in the woman womb. Some of these plants are considered magical and their main function during this process would be either to protect the women and her fetus from evil spirit during the various pregnancy terms or to “cut the invisible rope” with which the evil spirit has tied and badly positioned the fetus in the woman's womb. One of these magical plants is *Aframomum letestuanum*. This particular plant is never used alone in a recipe but always in association with other medicinal plants (Table 5). Moreover, it appeared in the treatment of almost all the most frequent complaints. These multiple uses of *Aframomum letestuanum* are related to its protective efficacy against evil spirit which according to our traditional healers may accentuate, whatever the pregnancy term, the ailments and complicate its treatment. Similar believes were registered in our previous survey during which *Aframomum letestuanum* was included in preparations because of its magico-religious properties which would protect patient and medicinal preparation from any spell and at the same time remove any one already present (Telefo et al., 2011).

From Table 4 it is also noted that nausea and vomiting represented only 3% of recorded recipes. This low frequency is quite surprising as nausea and vomiting are one of the most

**Table 2**

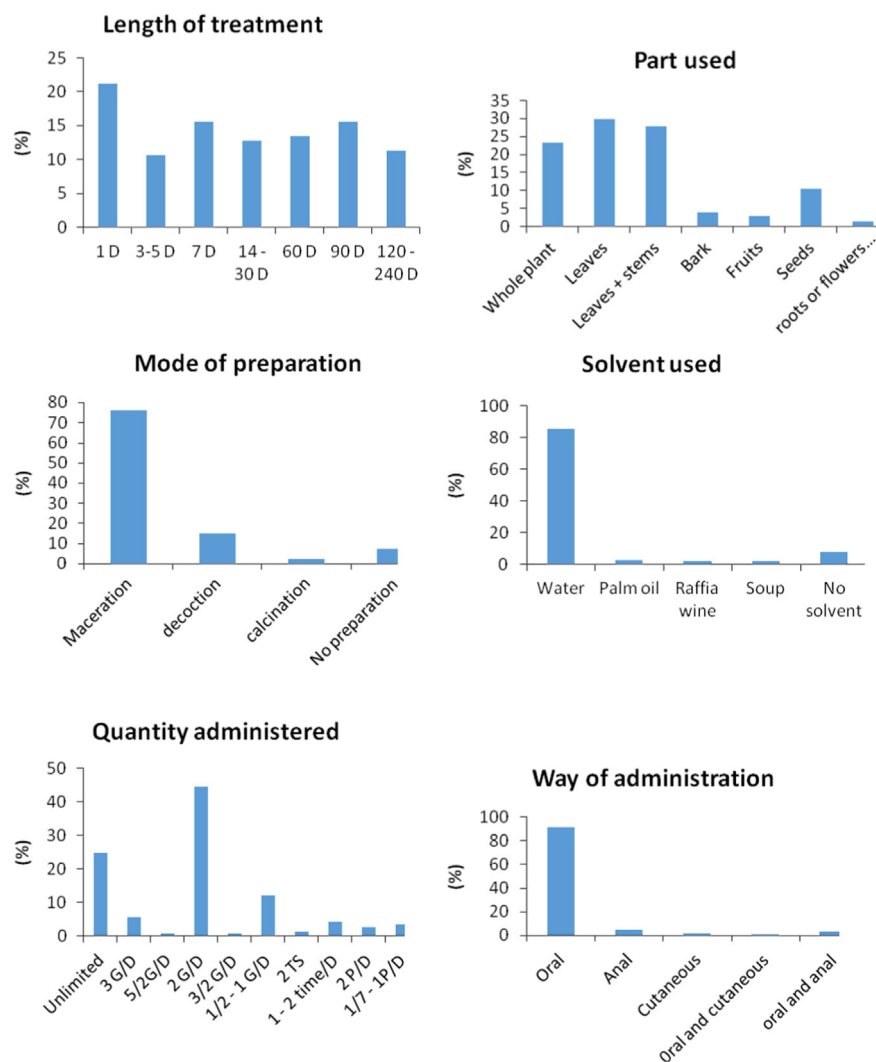
Identification and vernacular name of the plants counted according to their frequency of use.

Families	Scientific names	Reference number	Vernacular names (yemba)*	FC
Acanthaceae	<i>Acanthus montanus</i> T. Anders.	2127/SRFK	Kagorh doueh	2/588
	<i>Dicliptera silvestris</i> Lindau	23,606/SRF/Cam	Toueh lessouet	1/588
	<i>Eremomastax speciosa</i> (Hochst.) Cufod.	24,169/SRF/Cam	Panzem zemoh	7/588
	<i>Nelsonia canescens</i> (Lam) Spreng	6898/SRFK	Douet	32/588
Amaranthaceae	<i>Amaranthus cruentus</i> L.	42,335/HNC	Suieh suieh messor	2/588
	<i>Amaranthus hybridus</i> L.	15,514/HNC	Suieh suieh lah	3/588
	<i>Cyathula prostrata</i> (L.) Blume	20,416/SRF/Cam		1/588
Amaryllidaceae	<i>Crinum purpurascens</i> herb.	10,977/ SRF/Cam	Melan lesset	6/588
Anacardiaceae	<i>Mangifera indica</i> L.	1747/SRFK	Mangroe	2/588
Anthericaceae	<i>Allium cepa</i> L.Aloe buttneri L.	42,791/HNC52,232/HNC	GnoussiLelan guet or Aloe vera	1/58885/588
Apiaceae	<i>Centella asiatica</i> (Linn) Urb	5430/SRFK	Metouh vock	2/588
Apocynaceae	<i>Rauvolfia vomitoria</i> Afzelius	9253/SRF/Cam	Lepeuh mor	6/588
Araliaceae	<i>Schefflera barteri</i> (Seems) Harms	26,156/SRF/Cam	Guetsa	1/588
Asteraceae	<i>Ageratum conyzoides</i> Linn.	6575/SRFK	Tchouamo'	17/588
	<i>Bidens pilosa</i> Linn.	19,049/SRF/Cam	Yayet or tseutsè' lezeuk	5/588
	<i>Crassocephalum bauchieuse</i> (Hutch.) Milne –Redh.	37,884/HNC	Kohne kouieh	35/588
	<i>Crassocephalum biafrae</i> (Olie et Hern)S. More	27,751/SRF/Cam	Ben gwon	2/588
	<i>Crassocephalum mannii</i>	7623/SRF/Cam	Kepoueh	2/588
	<i>Mikania Cordata</i> (Burm. F.) Robunson	35,126/HNC	Gap sabia	1/588
	<i>Spilanthes filicanlis</i> (S. &T.) Adams.	22,027/SRF/Cam	Pantoueh	3/588
	<i>Vernonia amygdalina</i>		Ndoleh	2/588
	<i>Vernonia calvana</i> (Hook. F.)	7543/SRF/Cam	Pin' lakan	1/588
	<i>Impatiens burtomii</i> Hook. F.	59,368/HNC	Me vet toup toup	1/588
	<i>Basella alba</i> L.	20,523/SRF/Cam or 6467/SRF/Cam	Lelap doueh or douet lap	4/588
	<i>Markhamia lutea</i> K. Schum.	6474/SRF/Cam	Le keukah	1/588
Bignoniaceae	<i>Newbouldia laevis</i>	13,027/SRF/Cam		2/588
Caesalpiniaceae	<i>Spathodea campanulata</i> Beauv.	15,548/ SRF/Cam	Mefoufoueh	3/588
	<i>Senna alata</i>	29,494/HNC		1/588
Cannaceae	<i>Canna bidentata</i> Bertoloni	33,267/HNC	Nkouh-ndo	2/588
Caricaceae	<i>Carica papaya</i> Linn	16,254/SRF/cam	Papaya	2/588
Caryophyllaceae	<i>Drymaria cordata</i> (L.) Willd.	13,073/SRF/Cam	Lerte kiet	4/588
Caesalpiniaceae	<i>Cassia mimosoides</i> C. Linn.	50,640/HNC		2/588
Commelinaceae	<i>Commelina benghalensis</i> Lim.	33,365/HNC	Lewouwoueh	23/588
	<i>Anilema lanceolatum</i> Benth.	7924/SRF/Cam	Lelan tseuh tsèh	1/588
Compositae	<i>Dichrocephala integrifolia</i> (L. F.) O. Kize	5603/SRF/Cam	Titiet	2/588
	<i>Emilia coccinea</i> (Sims) G. Dom	19,052/SRF/Cam	Herbe de lapin	3/588
	<i>Erigeron floribundus</i> (H. B. et K.) Sch.Bys.	5619/SRF/Cam	Vin' guim	3/588
	<i>Taraxacum officinale</i> Weber	25,627/SRF/Cam	Teuteuieh lah	1/588
Convolvulaceae	<i>Ipomoea batatas</i> L.	15,625/SRF/Cam	Mekio' Lah	9/588
	<i>Ipomoea involucreta</i> P. Beauv.	20,583/SRF/Cam	Nkeke lessouet	2/588
	<i>Ipomoea tenuirostris</i>	36,041/ HNC	Mekio'o beuih	24/588
Crassulaceae	<i>Kalanchoe crenata</i> Haw	33,399/HNC	Ajoujoueh	8/588
Cucurbitaceae	<i>Coccinia barteri</i> (Hook. F.) Keag	21,367/ SRF/Cam		5/588
	<i>Cucumeropsis mannii</i> Naudin	16,748/SRF/Cam		1/588
Dracaenaceae	<i>Mukia maderaspatana</i> (L.) M.J.Rouen	8074/SRF/Cam	Deuh tsieh	1/588
	<i>Zheneria scabra</i> (L.F.) Sound.	36,043/HNC	Lelap	6/588
	<i>Dracaena deistiliena</i> Engl.	27,673/SRF/Cam	Keuh King (arbre de paix)	2/588
Euphorbiaceae	<i>Acalypha arvensis</i> Poepp	50,809/HNC		2/588
	<i>Croton macrostachyus</i> Hochst	33,574/HNC	Derte	3/588
	<i>Euphorbia grandifolia</i> (Haw.) Crolzt	21,408/SRF/Cam		1/588
	<i>Euphorbia hirta</i> Linn	5691/SRF/Cam	Pan Douet	1/588
Fabaceae	<i>Pseudarthria confertiflora</i> (A. Rich.) Bak.	17,465/SRF/Cam	Kuit kuit	1/588
	<i>Pseudarthria hookeri</i> Wight et Ara.	6016/SRF/Cam	Zem lekouet	1/588
Lamiaceae	<i>Ocimum gratissimum</i> Hochst	5817/SRF/Cam	Cotemadjou	4/588
Malvaceae	<i>Gossypium barbadense</i> L.	25,771/SRF/Cam	Cotonier	2/588
	<i>Hibiscus noldea</i>	23,814/SRF/Cam	Kagorh	25/588
	<i>Hibiscus rosa sinensis</i> Linn	18,609/SRF/cam	Hibiscus	16/588
	<i>Sida corymbosa</i> R.E. Fries.	38,888/HNC	Sinh peuieh	1/588
	<i>Sida veronicifolia</i> lam	29,010/SRF/Cam	Ming long	35/588
	<i>Stephania abyssinica</i> (Aill&Rich.) Walp.	17,046/SRF/Cam	Larpouh	1/588
Menispermaceae	<i>Ficus mucoso</i> Welw. Ex. Ficalho.	41,204/HNC	Le keukah	1/588
Moraceae	<i>Musa acuminata</i> Colla		Nkeundèh	4/588
Myrtaceae	<i>Psidium guajava</i>		goya	1/588
Oxalidaceae	<i>Biophytum petersianum</i> Klotzsch	7058/SRF/Cam	Keute por'	3/588
	<i>Oxalis corniculata</i> L.	11,524/SRF/Cam	Gouanh nvoueh	9/588
Periplocaceae	<i>Batesanthus purpureus</i> N. E. Br.	50,246/HNC		3/588
Piperaceae	<i>Piper capensis</i> Linn.	7170/SRF/Cam	Beuh-beuh for	1/588
	<i>Piper guineense</i> Schum et Thonn	6018/SRF/Cam	Sop	1/588
Poaceae	<i>Piper umbellatum</i> L.	11,546/SRF/Cam	Beuh beuh	6/588
	<i>Cymbopogon citratus</i> (D.C.) Stapf	18,628/SRF/Cam	Fiber grass	82/588
	<i>Imperata cylindrica</i> (L.) beauv.	12,271/SRF/Cam	Kenieuh	2/588
Polygonaceae	<i>Polygonum nepalensis</i> hein.	16,818/SRF/Cam	Vin' kouna	1/588
Polypodiaceae	<i>Platynerium stemaria</i> (P.B.)	11,791/SRF/Cam	Gouok metouing	2/588
Rhamnaceae	<i>Gouania longipetala</i> Hemsl.	59,303/HNC	Djieukah	1/588
Solanaceae	<i>Physalis micrantha</i> Link.	8979/SRF/Cam	Ajijieuh temtoueh	2/588
	<i>Physalis peruviana</i> L.	7629/SRF/Cam	Ajijieuh	4/588
	<i>Solanum aculeatissimum</i> Jaq	14,609/SRF/Cam	Suieh suieh meta lah	1/588

Table 2 (continued)

Families	Scientific names	Reference number	Vernacular names (yemba)*	FC
Sterculiaceae	<i>Solanum macrocarpon</i> Linn	43,001/HNC	Suieh suieh meta	2/588
	<i>Solanum melongena</i> L.	22,615/SRF/Cam	Gwigwi	1/588
	<i>Cola acuminata</i> Schott.	18,605/SRF/Cam	Le vroueh	3/588
Tiliaceae	<i>Triumphetta Cordifolia</i>	44,880/HNC	Npeuih (cuii)	4/588
Urticaceae	<i>Laportea Ovalifolia</i> (Schum & Thom) Chew	7454/SRF/Cam	Beuh bap doueh	2/588
Vitaceae	<i>Cyphostemma adenocaula</i> (Steud.) Descoings	5475/SRF/Cam	Deuh tsieh	1/588
	<i>Cyphostemma adenopodum</i> (Spagne) Descoings	5482/SRF/Cam	Deuh tsieh	2/588
	<i>Cyphostemma vogelii</i> (Hook F.) descoings	19,018/SRFK	Deuh tsieh femelle	1/588
Zingiberaceae	<i>Aframomum letestuanum</i> Gagnep.	43,138/HNC	Dedem	26/588
	<i>Aframomum melegueta</i> (Rose) K. Schum	39,065/HNC	Soc	1/588

\* Local and national spelling of the vernacular name in the study area of our survey.



**Fig. 2.** Mode of preparation, parts and solvent used, quantity administered, length of treatment and ways of administration of different recipes. D: Day, G: Glass, G/D: Glass per day, P: Pump, TS: Tea spoon.

precocious and frequent pregnancy ailments in women. They affect approximately 80% of pregnant women and are often difficult to treat using conventional medicine (Pinn and Pallett, 2002; Quinlan and Hill, 2003). This result could be related to the high amount of spices, among which *Zingiber officinale*, that are generally included in our daily meal or dishes and particularly in those of pregnant women.

Table 5 groups the various medicinal plants used in the treatment of the most frequent registered complaints (swelling of legs and ankles, facilitation of delivery, cleaning of the baby,

postpartum abdominal pain and bleeding during pregnancy). Fifty seven medicinal plants out of a total of 88 recorded during this survey are used in the preparation of recipes used for the treatment of the above ailments. Except for the bleeding during pregnancy, for which the indicated recipes are prepared with the association of at least two medicinal plants, the other ailments recipes use during their preparation only one medicinal plant. The diversity of plants used in each ailments increases with its frequency of citation. Thus, 32 different medicinal plants are used in recipes prepared for the treatment of the swelling of legs and

**Table 3**

List of the species according to the different recipes, mode of preparation, used parts and mode of administration.

Type of recipe (%)	Species	Part used	Mode of preparation	Solvent used	Way of administration	Quantity administered	Length of treatment (Days)	Medical use
1 <sup>a</sup> (74)	<i>Acalypha arvensis</i>	L	M	Water	A	1/3P/D	14	UI, SLA, FD,
	<i>Ageratum conyzoides</i>	L, S	M	Water	O	2G/D	240	SLA, F
	<i>Ageratum conyzoides</i>	L, S	–	–	O	Unlimited	240	Fo
	<i>Allium cepa</i>	Fr	–	–	O	1Fr/D	1	FD
	<i>Aloe buttneri</i>	L	M	Water	O	Unlimited	180	CB, SLA, AP, UI, PAP
	<i>Aloe buttneri</i>	L	–	–	C	2Time/D	14	CI
	<i>Amaranthus cruentus</i>	L	D	Water	O	2G/D	7	BP
	<i>Amaranthus hybridus</i>	L, S	M	Water	O	1G/D	60	FD, EF, SLA
	<i>Amaranthus hybridus</i>	L, S	M	Water	O	Unlimited	1	FD
	<i>Basella alba</i>	WP	D	Water	O	3G/D	60	SLA
	<i>Basella alba</i>	WP	M	Water	O	2G/D	90	SLA
	<i>Basella alba</i>	WP	M	Water	O	2G/D	30	BP, BPB
	<i>Batesanthus purpureus</i>	L	M	Water	O	2G/D	7	PAP
	<i>Batesanthus purpureus</i>	L, S	M	Water	O	2G/D	14	UI
	<i>Bidens pilosa</i>	L, S	M	Water	O	2G/D	7	F
	<i>Biophytum petersianum</i>	WP	M	Palm oil	O	Unlimited	1	FD
	<i>Canna bidentata</i>	L, S	D	Water	O	2G/D	240	FD
	<i>Cassia mimosoides</i>	L	D	Water	O	2G/D	3	FM
	<i>Coccinia barteri</i>	L	M	Water	O	2G/D	5	SLA, CB
	<i>Cola acuminata</i>	Fr	–	–	O	2Fr/D	7	PAP
	<i>Commelina benghalensis</i>	WP	M	Water	O	1G/D	60	FD, CB, SLA
	<i>Commelina benghalensis</i>	WP	M	Water	A	2P	1	FD
	<i>Commelina benghalensis</i>	WP	M	Water	O	2G/D	30	FD, SLA
	<i>Crassocephalum bauchieuse</i>	L, S	M	Water	O	Unlimited	90	CB, SLA
	<i>Crassocephalum bauchieuse</i>	L, S	M	Water	O	2G/D	240	SLA, BPB
	<i>Crinum purpurascens</i>	L	M	Water	O	Unlimited	1	FD
	<i>Croton macrostachyus</i>	L	–	–	O	1 time/D	1	FD
	<i>Croton macrostachyus</i>	L	M	Water	O	2G/D	60	SLA
	<i>Cymbopogon citratus</i>	WP	D	Water	O	Unlimited	180	SLA, F, CB
	<i>Cyphostemma adenocaula</i>	L, S	M	Water	O	2G/D	60	SLA
	<i>Dichocephala integrifolia</i>	L	M	Water	O	2G/D	5	SLA, CB
	<i>Dracaena deistiliena</i>	L	M	Water	O	Unlimited	180	SLA, PAP
	<i>Drymaria cordata</i>	WP	M	Water	O	2G/D	90	SLA
	<i>Drymaria cordata</i>	WP	M	Water	O	Unlimited	90	SLA
	<i>Drymaria cordata</i>	WP	M	Water	O	2G/D	1	FD
	<i>Drymaria cordata</i>	WP	M	Water	O	Unlimited	180	CB, FD, SLA
	<i>Emilia coccinea</i>	L, S	M	Water	O	2G/D	3	GA
	<i>Emilia coccinea</i>	L, S	M	Water	O	3G/D	60	SLA
	<i>Eremomastax speciosa</i>	L	Ca	Palm oil	O	Unlimited	30	NR
	<i>Eremomastax speciosa</i>	L	M	Water	O	2G/D	90	CB, UI, SLA
	<i>Erigeron floribundus</i>	L, S	M	Water	O	Unlimited	1	FD
	<i>Gossypium barbadense</i>	L	D	Water	O	2G/D	60	SLA
	<i>Gossypium barbadense</i>	L	D	Water	O	2G/D	60	A
	<i>Gouania longipetala</i>	L	M	Water	O	2G/D	5	CB, BS
	<i>Hibiscus noldea</i>	WP	M	Water	O	3G/D	120	UI, FD, PAP, SLA, CB
	<i>Hibiscus noldea</i>	WP	M	Water	O or A	1G or 1P	1	FD
	<i>Hibiscus rosa sinensis</i>	L	M	Water	O	Unlimited	90	FD
	<i>Hibiscus rosa sinensis</i>	L	M	Water	A	2P/D	1	FD
	<i>Impatiens burtonii</i>	L, S	M	Water	O	Unlimited	60	SLA, CB
	<i>Ipomoea batatas</i>	L, S	M	Water	O	1G	1	FD
	<i>Ipomoea batatas</i>	WP	M	Water	O	2G/D	30	CB, SLA, AP
	<i>Ipomoea involucreta</i>	L	M	Water	O	2G/D	90	FD
	<i>Ipomoea tenuirostris</i>	WP	M	Water	O	Unlimited	1	FD
	<i>Kalanchoe crenata</i>	L	D	Water	O	1G	1	FD
	<i>Kalanchoe crenata</i>	L	M	Water	O	1G/D	3	BP
	<i>Kalanchoe crenata</i>	L	–	–	O	Unlimited	1	FD
	<i>Laportea Ovalifolia</i>	L	D	Water	O	2G/D	90	BP
	<i>Laportea Ovalifolia</i>	L, S	D	Water	O	2G/D	7	BP
	<i>Mangifera indica</i>	L	M	Raffia wine	O	1/2G/D	4	FM
	<i>Mangifera indica</i>	B	D	Raffia wine	O	1/2G/D	4	FM
	<i>Markhamia lutea</i>	L	M	Water	O	3G/D	90	SLA
	<i>Markhamia lutea</i>	B	M	Water	O	2G/D	3	NV
	<i>Mukia maderaspatana</i>	WP	M	Water	O	2G/D	90	SLA
	<i>Mukia maderaspatana</i>	L	M	Water	O	2G/D	90	SLA
	<i>Musa acuminata</i>	Fr	D	raffia wine	O	2G/D	7	PAP
	<i>Musa acuminata</i>	Fr	–	–	O	1Fr/D	1	PAP
	<i>Nelsonia canescens</i>	WP	M	Water	O	Unlimited	60	FD, CB, SLA, BS
	<i>Newbouldia laevis</i>	B	M	Water, palm oil	O	Unlimited	7	PAP

Table 3 (continued)

Type of recipe (%)	Species	Part used	Mode of preparation	Solvent used	Way of administration	Quantity administered	Length of treatment (Days)	Medical use
2 (15)	<i>Ocimum gratissimum</i>	L	M	Water	O	Unlimited	30	NV, SLA, NR
	<i>Ocimum gratissimum</i>	L	–	–	O	Unlimited	3	AP
	<i>Oxalis corniculata</i>	WP	M	Water	O	Unlimited	60	SLA, CB, EF
	<i>Oxalis corniculata</i>	WP	M	Palm oil	O	Unlimited	30	SLA, CB, AP
	<i>Physalis micrantha</i>	L, S	M	Water	O	Unlimited	7	Bi
	<i>Physalis peruviana</i>	L, S	M	Water	O	Unlimited	3	SLA, Bi
	<i>Piper capensis</i>	L	M	Water	O	2G/D	7	UI
	<i>Piper umbellatum</i>	L	M	Water	O	Unlimited	1	FD
	<i>Platynerium stemaria</i>	L	–	–	C	2times/D	7	BA
	<i>Polygonum nepalensis</i>	L, S	M	Water	O	2G/D	90	Fo
	<i>Pseudarthria hookeri</i>	L	D	Water	O	1G/D	150	SLA, CB, BPB
	<i>Rauvolfia vomitoria</i>	L or B	M	Water	O	2G/D	3	NV, AP
	<i>Senna alata</i>	L, S	D	Water	O	Unlimited	7	F
	<i>Sida veronicifolia</i>	WP	M	Water	O	Unlimited	180	SLA, FD, BS, PAP, BP, AP, CB
	<i>Solanecio mannii</i>	L	M	Water	O and A	2G/D or 2P/D	90	CB, SLA, FD
	<i>Solanum macrocarpon</i>	Fr	–	–	O	1Fr/30D	60	SLA
	<i>Spathodea campanulata</i>	B	D	Water	O	2G/D	60	FD
	<i>Spathodea campanulata</i>	L	M	Water	O	1G/D	60	SLA, FD
	<i>Triumphetta Cordifolia</i>	S	M	Water	A	Unlimited	1	FD
	<i>Vernonia amygdalina</i>	L	M	Water	O	5/2G/D	14	CB, BP
	<i>Vernonia calvana</i>	L, S	M	Water	A	2P/D	30	UI, FD, CB
	<i>Zheneria scabra</i>	L, S	M	Water	O and C	2G/D	30	CI
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	1	FD
	<i>Commelina benghalensis</i>	WP						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	1	RP
	<i>Croton macrostachyus</i>	L						
	<i>Aframomum letestuanum</i>	Se	M	Water	O and A	3G/D and 1/7P/D	90	Fo
	<i>Emilia coccinea</i>	WP						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	1G/D	1	FD
	<i>Ipomoea tenuirostris</i>	WP						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	7	NV
	<i>Markhamia lutea</i>	B						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	1G/D or 2G/D	1or 240	FD, SLA, CB
	<i>Piper umbellatum</i>	L						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	7	NV
	<i>Rauvolfia vomitoria</i>	L						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	1	FD
	<i>Spathodea campanulata</i>	L						
	<i>Aframomum melegueta</i>	Se	M	Soup	O	1G/D	30	PAP, PH
	<i>Schefflera barteri</i>	B						
	<i>Ageratum conyzoides</i>	L,S	M	Water	O	2G/D	7	NV
	<i>Spilanthes filicanlis</i>	WP						
	<i>Ageratum conyzoides</i>	L,S	M	Water	O	Unlimited	1	FD
	<i>Piper umbellatum</i>	L						
	<i>Amaranthus hybridus</i>	L,S	D	Water	O	2G/D	90	EF
	<i>Laportea Ovalifolia</i>	L, S						
	<i>Commelina benghalensis</i>	L, S	M	Water	O and A	3G/D and 1P/D	1	FD
	<i>Euphorbia hirta</i>	L, S						
	<i>Commelina benghalensis</i>	WP	M	Water	O and A	1G/D and 1P/D	1	FD
	<i>Hibiscus noldea</i>	WP						
	<i>Commelina benghalensis</i>	WP	M	Water	O	2G/D	3	BP
	<i>Hibiscus noldea</i>	L,S						
	<i>Commelina benghalensis</i>	WP	M	Water	O	2G/D	90	SLA, CB
	<i>Ipomoea tenuirostris</i>	WP						
	<i>Cymbopogon citratus</i>	WP	M	Water	O	3G/D	240	SLA
	<i>Hibiscus noldea</i>	L,S						
	<i>Solanum macrocarpon</i>	L	M	Soup	O	2G/D	7	PH, BP
	<i>Solanum melongena</i>	L						



Table 3 (continued)

Type of recipe (%)	Species	Part used	Mode of preparation	Solvent used	Way of administration	Quantity administered	Length of treatment (Days)	Medical use
3 (10)	<i>Acanthus montanus</i>	L,S	D	Water	O	3/2G/D	60	SLA
	<i>Aframomum letestuanum</i>	Se						
	<i>Hibiscus noldea</i>	L, S						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	3G/D	7	MP
	<i>Aloe buettneri</i>	L						
	<i>Aneilema lanceolatum</i>	WP						
	<i>Aframomum letestuanum</i>	Se	Ca	Palm oil	O	2TS/D	30	BPB
	<i>Ageratum conyzoides</i>	L, S						
	<i>Biophytum petersianum</i>	WP						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	90	FD, PAP
	<i>Ageratum conyzoides</i>	L, S						
	<i>Eremomastax speciosa</i>	L, S						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	1G/D	1	RP
	<i>Ageratum conyzoides</i>	L,S						
	<i>Imperata cylindrica</i>	R						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	1G/D	7	PH
	<i>Amaranthus cruentus</i>	L						
	<i>Batesanthus purpureus</i>	L						
	<i>Aframomum letestuanum</i>	Se	D	Water	O	2G/D	14	BP
	<i>Amaranthus cruentus</i>	Fl						
	<i>Solanum aculeatissimum</i>	Fr						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	1G/D	5	BP
	<i>Eremomastax speciosa</i>	L						
	<i>Mikania Cordata</i>	L,S						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	Unlimited	90	ES
	<i>Euphorbia hirta</i>	WP						
	<i>Nelsonia canescens</i>	WP						
	<i>Ageratum conyzoides</i>	L, S	M	Water	O	2G/D	240	ES
	<i>Bidens pilosa</i>	L, S						
	<i>Erigeron floribundus</i>	L, S						
	<i>Aloe buettneri</i>	L, S	M	Water	O	2G/D	30	FD
	<i>Hibiscus noldea</i>	L, S						
	<i>Sida corymbosa</i>	L, S						
	<i>Basella alba</i>	WP	M	Water	O	2G/D	150	SLA
	<i>Ipomoea tenuirostris</i>	WP						
	<i>Zheneria scabra</i>	WP						
4 (2)	<i>Ageratum conyzoides</i>	WP	D	Water	O	2G/D	7	F
	<i>Carica papaya</i>	L						
	<i>Mangifera indica</i>	L or B						
	<i>Psidium guajava</i>	L						
	<i>Aframomum letestuanum</i>	Se	M	Water	O	2G/D	14	ES
	<i>Ageratum conyzoides</i>	L,S						
	<i>Bidens pilosa</i>	L,S						
	<i>Spilanthes filicanlis</i>	WP						

<sup>a</sup> Number of plants used per recipe; A, anal; A, anemia; AP, abdominal pains; B, bark; BA, breast ache; Bi, bile; BP, bleeding during pregnancy; BPB, bad positioning of the baby; BS, body sweats; C, cutaneous; Ca, Calcination; CB, cleaning of the baby; Cl, cutaneous itching; D, decoction; EF, enlargement of the fetus; ES, evil spirit; F, Fiber; FD, facilitation of delivery; Fl, flower; FM, flow of milk; Fo, Fortification; Fr, fruit; G/D, glass per day; GA, gastric ache; I, infusion; L, leaves; M, maceration; MP, muscular pains; NR nappy rash; NV, nausea and vomiting; O, oral; P, pump; PAP, postpartum abdominal pain; PH, postpartum hemorrhaging; Pr, protection; R, roots; RP, retained placenta; S, stem; Se, seed; SLA, swelling of legs and ankles; TS, Tea spoon; UI, urogenital infections; WP, whole plant.

ankles. For facilitation of delivery, cleaning of the baby, postpartum abdominal pain and bleeding during pregnancy, 30, 21, 15 and 8 various medicinal plants are respectively used. As concerns the swelling of legs and ankles, *Cymbopogon citratus* (10%) registered the highest frequency of use in recipes. It was followed by *Aloe buettneri*, *Crassocephalum bauchiense* and *Sida veronicifolia*. The diuretic potential of *Cymbopogon citratus* may explain its high frequency of use (Shah et al., 2011). Medicinal plants frequently used to facilitate baby delivery are *Comelina benghalensis* (14%), *Hibiscus noldea* (12%), *Kalanchoe crenata* (12%), *Hibiscus rosa*

*sinensis* (10%) and *Aloe buettneri* (08%). For baby cleaning purposes, *Aloe buettneri* followed by *Crassocephalum bauchiense* are frequently used.

The veracities of the recorded information relatively to the utilization of these various medicinal plants for the treatment of the indicated ailments are confirmed by many scientific data. For example, the efficacy of *Sida veronicifolia*, the highest recorded plant for Postpartum Abdominal Pain, in reducing pains of labor during or after childbirth is well proven (Focho et al., 2009a, 2009b; Pandey et al., 2009). Similar results are obtained with

Distribution of recipes en fonction of pregnancy complaints and childbirth ailments.

Pregnancy and childbirth complaints	Number of recipes used per type				Total number of recipes (%)
	Type I	Type II	Type III	Type IV	
Abdominal pains (AP)	6	0	0	0	6 (3)
Anemia (A)	1	0	0	0	1 (0)
Bad positioning of the baby (BPB)	3	0	1	0	4 (2)
Bile (Bi)	2	0	0	0	2 (1)
Bleeding during pregnancy (BP)	7	2	2	0	11 (6)
Body sweat (BS)	3	0	0	0	3 (2)
Breast aches (BA)	1	0	0	0	1 (0)
Cleaning of the baby (CB)	20	2	0	0	22 (12)
Cutaneous itching (CI)	2	0	0	0	2 (1)
Enlargement of the fetus (EF)	2	1	0	0	3 (2)
Evil spirit (ES)	0	0	2	1	3 (2)
Facilitation of delivery (FD)	29	7	2	0	40 (22)
Fibrome (F)	4	0	0	1	5 (3)
Flow of milk (FM)	3	0	0	0	3 (2)
Fortification (Fo)	2	1	0	0	3 (2)
Gastric aches (GA)	1	0	0	0	1 (0)
Muscular pain (MP)	0	0	1	0	1 (0)
Nappy rash (NR)	2	0	0	0	2 (1)
Nausea and vomiting (NV)	3	3	0	0	6 (3)
Postpartum abdominal pain (PAP)	9	1	1	0	11 (6)
Postpartum haemoraging (PH)	0	2	1	0	3 (2)
Retained placenta	0	1	1	0	2 (1)
Swelling of legs and ankles (SLA)	38	3	2	0	43 (23)
Urogenital infections	7	0	0	0	7 (4)
Total	147	23	13	2	185 (100)

Most frequent pregnancy complaints and childbirth ailments and plants used for their treatment.

[illegible]

Table 5 (continued)

Name of plant used in treatment	Most frequent pregnancy and childbirth complaints with their frequencies														
	Swelling of legs and ankles			Facilitation of Delivery			Cleaning of the Baby			Postpartum Abdominal Pain			Bleeding during Pregnancy		
	NA	NM	FC	NA	NM	FC	NA	NM	FC	NA	NM	FC	NA	NM	FC
<i>Ipomoea involucreta</i>				2	–	2/588									
<i>Ipomoea tenuirostris</i>	4	2	6/588	4	–	4/588	1	–	1/588						
<i>Kalanchoe crenata</i>				12	2	14/588				1	1	2/588	3	1	4/588
<i>Markhamia lutea</i>	1	–	1/588												
<i>Musa acuminata</i>										3	–	3/588			
<i>Nelsonia canescens</i>	15	–	15/588	4	–	4/588	7	–	7/588						
<i>Ocimum gratissimum</i>	1	–	1/588												
<i>Oxalis corniculata</i>	7	–	7/588				2	–	2/588						
<i>Piper guineense</i>				–	1	1/588									
<i>Piper umbellatum</i>	2	–	2/588	1	2	3/588	–	1	1/588						
<i>Pseudarthria hookeri</i>							1	–	1/588						
<i>Rauvolfia vomitoria</i>				1	–	1/588									
<i>Schefflera barteri</i>										–	1	1/588			
<i>Sida corymbosa</i>				–	1	1/588									
<i>Sida veronicifolia</i>	19	1	20/588	2	–	2/588	3	1	4/588	7	1	8/588	1	–	1/588
<i>Solanum aculeatissimum</i>													–	1	1/588
<i>Solanum macrocarpon</i>										–	1	1/588	–	1	1/588
<i>Solanum melongena</i>										–	1	1/588	–	1	1/588
<i>Spathodea campanulata</i>	1	–	1/588	3	–	3/588									
<i>Spilanthes filicanlis</i>				–	1	1/588									
<i>Taraxacum officinale</i>													–	1	1/588
<i>Triumphetta cordifolia</i>				3	–	3/588	1	–	1/588						
<i>Zheneria scabra</i>	1	1	2/588				1	–	1/588						

FC, frequency of citation; NA, number of time each plant is used alone in the recipe; NM, number of time each plant is used as a mixture in the recipe.

Table 6

Pharmacological Activities and major phytochemical compounds found in the plants.

Families	Species	Major phytochemical compounds	Therapeutic utilization
Acanthaceae	<i>Acanthus montanus</i>	No report	Post-partum pains, threatened abortion pelvic, inflammatory disease, (Asongalem et al., 2008; Focho et al., 2009a, 2009b); urinary tract infection, stomach ailments (Wagate et al., 2008; Jiofack et al., 2010); defective lactation (Njamen et al., 2013).
	<i>Eremomastax speciosa</i>	Alkaloids, flavonoids, saponins and tannins (Oben et al., 2006).	Pain (Jiofack et al., 2010); anemia, spurious labor pains, post-partum burns and hemorrhage (Okokon et al., 2007); hemorrhoids and urinary tract infection (Adjanohoun et al., 1996); urinary tract infection, typhoid fever (Njamen et al., 2013; Tsobou et al., 2013).
	<i>Nelsonia canescens</i>	Volatile oils, alkaloids, tannins, flavanoids, carbohydrates, glycosides and phenols (Mathias et al., 2007; Dasgupta et al., 2012).	Analgesic, treat constipation (Owoyele et al., 2006), syphilis, gastric problems (Adhikari et al., 2010), difficult delivery (Focho et al., 2009a, 2009b), hepatic troubles (Dasgupta et al., 2012).
Amaranthaceae	<i>Amaranthus cruentus</i>	Polyphenols, tannins, iridoids, flavonoids, steroids cardenolids, carotenoids, sapononins, betalains and triterpenes (Nana et al., 2012).	Respiratory disease (Mensah et al., 2008).
	<i>Amaranthus hybridus</i>	Polyphenols, tannins, iridoids, flavonoids, steroids, cardenolids, carotenoids, sapononins, betalains and triterpenes (Nana et al., 2012).	Urinary tract infection, stomach ailments (Wagate et al., 2008) liver infections, pain, stomachaches, wound, dysentery, and it is laxative and diuretic (Nana et al., 2012).
	<i>Cyathula prostrate</i>	Saponins, terpenoids, tannins, flavonoids, alkaloids, cardiac glycosides, steroids (Ogu et al., 2012).	Analgesic (Ibrahim et al., 2012), skin diseases, liver problem, nausea, stomach ailments (Burkill, 1985; Kannappan and Sundaram, 2009), fiber (Rajith and Ramachandran, 2010), miscarriages (Burkill, 1985).
Amaryllidaceae	<i>Crinum purpurascens</i>	Alkaloids, saponins, favonoids, cardiac glycosides, triterpenes, steroids, anthocyanins (Nkanwen et al., 2009).	anti-poison (Noumi, 2004), treat microbial and urogenital infection (Nkanwen et al., 2009).
Anacardiaceae	<i>Mangifera indica</i>	Alkaloids, tannins, triterpenes, saponins, cardiac glycosides (Rakholiya and Chanda, 2012).	Skin diseases, anemia, urinary tract infection (Muanza et al., 1994); hepatic disorders (Weniger et al., 1986), gastric disorders (Grenard et al., 1987); malaria (Ariwaodo et al., 2012); typhoid fever (Tsobou et al., 2013).
Anthericaceae	<i>Allium cepa</i>	Carbohydrates, glycosides, proteins, alkaloids, acid compounds, saponins, flavonoids, oils, reducing sugars (Ugwoke and Ezugwe, 2010).	Fever, postpartum remedy, stomachache (Roosita et al., 2008).
	<i>Aloe buttneri</i>	Glycosides, quinines, anthraquinonic derivatives, and coumarins (Telefo et al., 2004).	Post-partum pains (Focho et al., 2009a, 2009b); defective lactation, amnionitis affecting the newborn (Njamen et al., 2013).
Apiaceae	<i>Centella asiatica</i>	Saponins, flavonoids, tannins, alkaloids, phytosterols, free aminoacids, glycosides, fatty acids (Gohil et al., 2010).	Headache (Unnikannan et al., 2012), female genitourinary tract infection (Gohil et al., 2010), constipation, (Singh and Rawat, 2011.), gastric disorders, liver troubles (Shaheen et al., 2010), syphilis, skin diseases, (Kapale, 2012), hemorrhoids (Sonowal

Table 6 (continued)

Families	Species	Major phytochemical compounds	Therapeutic utilization
Apocynaceae	<i>Rauvolfia vomitoria</i>	Tannins, alkaloids, steroids, glycosides, flavonoids, phenolic compounds and saponins (Ojo et al., 2012; Ajayi and Ojelere, 2013).	and Barua, 2011.); fever (Britto et al., 2010; Nath et al., 2014 ), vomiting (Jiofack et al., 2010); Abdominal ache (Tolossa et al., 2013). Swelling of legs (N'Guessan et al., 2009); venereal diseases, gastro-intestinal diseases, lowering of blood pressure, sexual complaints, malaria (Fannang et al., 2011); jaundice, herpes, internal disorder (Ariwaodo et al., 2012); typhoid fever (Tsobou et al., 2013).
Asteraceae	<i>Ageratum conyzoides</i>	Alkaloids, flavonoids, phenols, chromenes, cardiac glycosides, benzofurans, coumarins, sterols and terpenoids (Adewole and Okunade, 2002; Galani et al., 2013).	Protective fetish (Burkill, 1985); purgative, febrifuge (Githens, 1948); headaches (Adjanohoun et al., 1988; Jiofack et al., 2010); treat skin diseases, pain (Okunade, 1981); gynecological diseases (Sharma and Sharma, 1995; N'Guessan et al., 2009). amnionitis affecting the newborn, placenta retention (Njamen et al., 2013); gastritis, quick delivery (Jiofack et al., 2010); postpartum remedy, lung disease (Roosita et al., 2008); typhoid fever (Tsobou et al., 2013).
	<i>Bidens pilosa</i>	Flavonoids, terpenes, lipids, phenylpropanoids, cardiac glycosides, anthraquinones benzenoids, saponins, alkaloids and steroids (Taylor, 2005; Okoli et al., 2009; Galani et al., 2013).	Post-partum hemorrhage (Focho et al., 2009a, 2009b), water retention, fiber, malaria, headache, urinary and vaginal infections, promote milk production, urination (Taylor, 2005; Jiofack et al., 2010); spurious labor pains (Njamen et al., 2013) typhoid fever (Tsobou et al., 2013).
	<i>Crassocephalum bauchieuse</i>	Alkaloids, phenols, tannins and sterols (Mouokeu et al., 2011).	Gastrointestinal infections (Mouokeu et al., 2011), pain (Taiwe et al., 2012).
	<i>Crassocephalum biafrae</i>	No report	Pelvic inflammatory disease (Focho et al., 2009a, 2009b).
	<i>Mikania Cordata</i>	Saponins, alkaloids, flavonoids, tannins,steroids (Dewi et al., 2011).	Analgesic properties (Bhattacharya et al., 1988), treat fever, affections of the stomach and intestines,stop bleeding (Patar and Hisham, 2012); quick delivery (N'Guessan et al., 2009).
	<i>Spilanthes filicaulis</i>	Phenols, alkaloids, saponins, flavonoids, tannins, cardiac glycosides, anthraquinones and cyanogenic glycosides (Wahab et al., 2013).	Urinary tract infection (Njamen et al., 2013); poisoning (Jiofack et al., 2010); headache, pain (Soladoye and Oyesiku, 2008).
	<i>Vernonia amygdalina</i>	Saponins, alkaloids, terpenes, steroids, coumarins, flavonoids, phenolic acids, lignans, xanthenes, anthraquinones, edotides and sesquiterpenes (Farombi and Owioye, 2011).	Nausea, loss of appetite, pain, sexually transmitted diseases, malaria, fevers, wounds and gastrointestinal tract problems (Argheore et al., 1998; Madureira et al., 2002; Ijeh and Ejike, 2011); childbirth facilitation (Attah et al., 2012).
Balsaminaceae	<i>Impatiens burtomii</i>	No report	Spurious labor (Focho et al., 2009a, 2009b).
Basellaceae	<i>Basella alba</i>	Tannins, terpenes, saponins, steroids, anthraquinone carbohydrate (Oyewole and Kalejaiye, 2012); proteins, fat, vitamins A, C, E, K, B9; minerals, flavonoids (Yang et al., 2008); amino acid (Khare, 2007); peptide, phenolic compounds (Maisuthisakul and Ritthiruangdej, 2008).	Diuretic, anti-poison, febrifuge (Bamidele et al., 2010; Duke and Ayensu, 1985), laxative (Kirtikar and Basu, 1975; Larkcom, 1991; Phillips and Rix, 1995); treat headaches (Kirtikar and Basu, 1975); acne (Sushila et al., 2010); anemia (Rahmatullah et al., 2010); malaria (Anandarajagopal et al., 2011); post-partum stomach pains and increase milk production, threatened abortion, spurious labor. (Focho et al., 2009a, 2009b); alleviate labor (Bamidele et al., 2010); dystocia (Njamen et al., 2013). Syphilis (Jiofack et al., 2010); viral diseases, diarrhea (Joselin et al., 2013).
Bignoniaceae	<i>Markhamia lutea</i>	Flavonoids, saponins, phytosterols, steroids, carbohydrates, coumarines, terpenoids, proteins (Joselin et al., 2013).	Fever, stomachache, syphilis, constipation, (Akunyili, 2000; Iwu, 2007), wounds, migraine, skin infections (Ariwaodo et al., 2012).
	<i>Newbouldia laevis</i>	Tannins, alkaloids, flavonoids, saponins, terpenes, steroidal and cardiac glycosides (Akinbami, 2012; Usman and Osuji, 2007).	Diuretic, antimalarial, treat stomachaches, (Pianaro et al., 2007); post-partum pain, pelvic inflammatory diseases (Focho et al., 2009a, 2009b); typhoid fever (Tsobou et al., 2013).
	<i>Spathodea campanulata</i>	Phenolic compounds, alkaloids, flavonoids, terpenoids, quinones, phytosterols, coumarines, carbohydrates, proteins, steroids, saponins (Joselin et al., 2013); spathodic acid, ursolic acid, pectic substances and tomentosolic acid (Pianaro et al., 2007).	
Caesalpiniaceae	<i>Senna alata</i>	Saponins, flavonoids, cardiac glycosides, cardenolides and dienolides, phenols, alkaloids (Yakubu et al., 2010).	Clean of womb after birth (Ticktin and Dalle, 2005; Ticktin and Dalle, 2005); abortion (Yakubu et al., 2010); fever, fast delivery, yellow fever, hemorrhoids (Jiofack et al., 2010); skin diseases, dysentery (Ariwaodo et al., 2012); typhoid fever (Tsobou et al., 2013).
	<i>Cassia mimosoides</i>	Protein, fatty acids, tannin, aloe-emodin, emodin (Chiu and Chang, 1995).	Improves liver, stomach, and kidney functions, inflammation; diuretic (Li, 2006).
Cannaceae	<i>Canna bidentata</i>	Saponins, alkaloids, tannins, steroids, reducing sugars (Ajayi and Ojelere, 2013).	Infectious diseases(Ajayi and Ojelere, 2013); malaria, fevers (Madureira et al., 2002).
Caricaceae	<i>Carica papaya</i>	Alkaloids, minerals, vitamins, carotenoids, flavonoids, and monoterpenoids (Milind and Gurditta, 2011).	Swelling, fever, pain, indigestion, (Jiofack et al., 2010; Milind and Gurditta, 2011); diuretic, uterotonic, tonic, relieves obesity, complaints of urinary tract, skin disease, laxative, abortifacient, antifungal and anti-bacterial (Cherian, 2000; Arya, 2005; Doughari et al., 2007; Wright et al., 2007; Krishna et al., 2008; Nwinyi et al.,2010); post-partum remedy (Roosita et al., 2008); typhoid fever (Tsobou et al., 2013).
Caryophyllaceae	<i>Drymaria cordata</i>	Diterpenes, tannins; triterpenes, steroids (Barua et al., 2011); Stigmasterol, cerebroside, acylated stigmasteryl glucoside, stigmasteryl glucoside, monogalactosyldiacylglycerol, glucocerebroside, digalactosyldiacylglycerol (Nono et al., 2014).	Febrifuge, laxative (Saklani and Jain, 1994); anti-bacterial (Mukherjee et al., 1998); anti-inflammatory (Adeyemi et al., 2008; Barua et al., 2010); analgesic (Barua et al., 2011; Akindele et al., 2012), evil eye (Tolossa et al., 2013); fever (Nath et al., 2014 ); bile complaints (Kumar et al., 2011).
Commelinaceae	<i>Commelina benghalensis</i>	Alkaloids, tannins, steroids, saponins and flavonoids (Dhole et al., 2012).	Amnionitis affecting the newborn, polyhydramnios, retained dead fetus (Njamen et al., 2013); facilitate childbirth, headache



Table 6 (continued)

Families	Species	Major phytochemical compounds	Therapeutic utilization
Compositae	<i>Dichrocephala integrifolia</i>	Alkaloids, saponins, carotinoid, tannins, phytosterols and saponins (Mohammed and Teshale, 2012).	(Jiofack et al., 2010); pain, skin diseases, diuretic, febrifuge (Deyuan and Robert, 2000; Mollik et al., 2010).
	<i>Emilia coccinea</i>	Saponins, triterpenoids, flavonoids, steroids, phenols, cardiac glycosides, alkaloids and tannins (Edeoga et al., 2005; Faleye et al., 2012).	Vulvovaginitis (Njamen et al., 2013); antiinflammatory, antistomach (Li, 2006); antibacterial (Chhabra and Uiso, 1991). Gastritis (Jiofack et al., 2010), fever (Agoha, 1981), colic, wounds (Faleye et al., 2012).
	<i>Erigeron floribundus</i> <i>Taraxacum officinale</i>	Saponins, flavonoids, sterols, triterpenes, glycosides, alkaloids, oils, phenols and tannins (Asongalem et al., 2004; Galani et al., 2013). Saponins, triterpenoids, tannins, phenols, alkaloids, flavonoids and glycosides (Mir et al., 2013).	Analgesic (Asongalem et al., 2004), gastric problems (Agnem et al., 2011); typhoid fever (Tsobou et al., 2013). Anemia (Mahesh et al., 2010); jaundice, fever, gastrointestinal problems (Modaresi, 2012), liver disorders, diuretic, analgesic (Jiofack et al., 2010; Mir et al., 2013).
Convolvulaceae	<i>Ipomoea batatas</i>	Triterpenes, anthraquinones, steroids, alkaloids, tannins, coumarins, flavonoids, saponins, and phenolic acids (Pochapski et al., 2011).	Stomach distress, nausea, fever (DeVries, 2010), constipation, general weakness (Ogbemudia et al., 2013); typhoid fever (Tsobou et al., 2013).
	<i>Ipomoea involucreata</i>	Alkaloids, flavonoids, saponins, terpenoids and tannins (Uche et al., 2011).	Pains (Uche et al., 2011); anemia (Koffuor et al., 2012); fever, gonorrhea (Oliver, 1960); jaundice (Bouquet and Debray, 1974); headache, hasten expulsion of the after-birth (Bouquet, 1969).
Crassulaceae	<i>Kalanchoe crenata</i>	Terpenoids, sterols, tannins, polysaccharids, saponins, flavonoids and alkaloids (Kablan et al., 2008; Kamgang et al., 2008).	Analgesic and anti-inflammatory (Dimo et al., 2006); antimicrobial (Kablan et al., 2008) promote milk production (N'Guessan et al., 2009); treatment of smooth muscle spasm, diuretic (Ariwaodo et al., 2012).
Cucurbitaceae	<i>Coccinia barteri</i>	No report	Veneral diseases (Ariwaodo et al., 2012).
	<i>Mukia maderaspatana</i>	Glycosides, carbohydrates, phenols, alkaloids, saponins, flavonoids, tannins, coumarines, triterpenes and steroids (Wani et al., 2011; Kavitha et al., 2013).	Constipation, vertigo, burning sensation (Kavitha et al., 2013); diuretic, stomachic (Wani et al., 2011).
	<i>Zheneria scabra</i>	No report	Threatened abortion (Focho et al., 2009a, 2009b); analgesic (Akele, 2012); skin diseases, bacterial infection, cleansing uterus before a child is delivered, malaria, urinary tract infection (Njamen et al., 2013; Moshi et al., 2012); typhoid fever (Tsobou et al., 2013).
Euphorbiaceae	<i>Croton macrostachyus</i>	Alkaloids, phenols, tannins, antraquinones and essential oils (Teugwa et al., 2013).	Vasorelaxant, antimalarial (Teugwa et al., 2013); pain, abdominal colic (Mesfin et al., 2005) typhoid fever (Tsobou et al., 2013).
	<i>Euphorbia hirta</i>	Tannins, saponins, flavonoids, cardiac glycosides, alkaloids, triterpenoids and steroids (Okoli et al., 2009; Kumar et al., 2010).	Analgesic during labor (Focho et al., 2009a, 2009b); sedative, antimalarial (Williamson, 2002); induce the flow of milk (N'Guessan et al., 2009; Okoli et al., 2009); treat jaundice, pimples, gonorrhea, digestive problems, skin diseases (Kumar et al., 2010); gastritis (Jiofack et al., 2010); vulvovaginitis, amnionitis affecting the newborn, polyhydramnios (Njamen et al., 2013); postpartum remedy (Roosita et al., 2008). Typhoid fever (Tsobou et al., 2013).
Fabaceae	<i>Pseudarthria confertiflora</i>	No report	
	<i>Pseudarthria hookeri</i>	No report	Fever, jaundice, wounds (Al-Duais et al., 2009).
Lamiaceae	<i>Ocimum gratissimum</i>	Alkaloids, phenols, sterols, flavonoids, triterpenes, cardiac glycosides and coumarins (Galani et al., 2013).	Stimulate uterine muscle contractility, facilitate childbirth and reduce associated pain (Attah et al., 2012); gastritis, fever, headache, constipation (Jiofack et al., 2010); sedative, skin diseases (Prabhu et al., 2009); typhoid fever (Tsobou et al., 2013).
Malvaceae	<i>Gossypium barbadense</i>	Alkaloids, carbohydrates, proteins, cardiac glycosides, phlobatannins, tannins, and flavonoids (Apena et al., 2004).	Nausea, abortion (Sawyer, 1955); prevent miscarriage (Ticktin and Dalle, 2005); cutaneous and subcutaneous parasitic infection, veneral diseases, malaria, hypertension, palpitations (Ikobi et al., 2012); typhoid fever (Tsobou et al., 2013).
	<i>Hibiscus noldea</i>	No report	Headache, abortion (Chifundera, 1998; Adjanohoun et al., 1996).
	<i>Hibiscus rosa sinensis</i>	Alkaloids, phenols, steroids, flavonoids, triterpenoids, fatty acids, tannins, reducing sugar, mucilages, glycosides (Anonymous, 2001; Focho et al., 2009a, 2009b; Gupta et al., 2009).	Female complaints (Lans, 2007); dystocia (Njamen et al., 2013); gonorrhea, stomach pain, diuretic, induce abortion, labor, stimulate expulsion of afterbirth and milk production (Burkhill, 1966; Nath et al., 1992; Jadhav et al., 2009); post-partum hemorrhaging (Michel et al., 2007).
	<i>Sida corymbosa</i>	Pseudotannins, flavonoids, phenolic acid, choline and oxalic acid (Pandey et al., 2009).	Stimulate uterine muscle contractility, facilitate childbirth and reduce associated pain (Attah et al., 2012).
	<i>Sida veronicifolia</i>	No report	Abortion (Lutterodt, 1988); short and reduce the pain of labor in childbirth, post-partum pain and the period of postpartum bleeding; treat gonorrhea, (Focho et al., 2009a, 2009b; Pandey et al., 2009).
Moraceae	<i>Ficus mucoso</i>	No report	Abortion (N'Guessan et al., 2009).
Musaceae	<i>Musa acuminata</i>	Glycosides, tannins, saponins, steroids, phenols, flavonoids (Sumathy et al., 2011).	Hemorrhoids, gonorrhea, anemia, pains (Sumathy et al., 2011; Ariwaodo et al., 2012); typhoid fever (Tsobou et al., 2013).
Oxalidaceae	<i>Biophytum petersianum</i>	No report	Wound, malaria, pain, gonorrhea and stomachache, antiinflammatory (Burkill, 1997; Gronhaug et al., 2008; Inngjerdigen et al., 2006).
	<i>Oxalis corniculata</i>	Flavonoids, tannins, fatty acids, alkaloids, coumarins, phytosterols, glycosides, phenol, volatile oil and galacto-glycerolipid (Badwaik et al., 2011; Pratik et al., 2011).	Analgesic, diuretic, febrifuge, antifungal (Badwaik et al., 2011); gonorrhea (Focho et al., 2009a, 2009b); stomach problem (Nath et al., 2014).

Table 6 (continued)

Families	Species	Major phytochemical compounds	Therapeutic utilization
Piperaceae	<i>Piper capensis</i>	Quinones, alkaloids, phenolic compounds, sterols, steroids and amino acids (Thorburn, 2010).	Infectious diseases, antimicrobial (Thorburn, 2010).
	<i>Piper guineense</i>	Alkaloids, flavonoids, tannins, saponins, steroids, cardiac glycosides and terpenes (Echo et al., 2012).	Anemia (Jiofack et al., 2010); stomach ache, gonorrhea (Mensah et al., 2008).
	<i>Piper umbellatum</i>	Alkaloid, saponin, tannin and inulin (Mensah et al., 2008).	Fetal malpresentation (Njamen et al., 2013); change of sex at child birth, breast infection, calm birth pains (Jiofack et al., 2010); stomachache (Mensah et al., 2008).
Poaceae	<i>Cymbopogon citratus</i>	Terpenes, alcohols, ketones, esters, aldehydes, phenols, saponins, anthraquinones, cardiac glycosides, coumarins, tannins and mainly flavonoids, (Shah et al., 2011; Galani et al., 2013).	Promote the flow of milk (Ticktin and Dalle, 2005); post-partum pains (Focho et al., 2009a, 2009b); antispasmodic, hypotensive, analgesic, diuretic, antimalarial, febrifuge and treatment gastrointestinal disorders (Jiofack et al., 2010; Shah et al., 2011).
	<i>Imperata cylindrical</i>	No report	Fever, postpartum remedy, muscle pain (Roosita et al., 2008); gonorrhea (Jiofack et al., 2010); bleeding, vomiting, diuretic (Li, 2006); typhoid fever (Tsobou et al., 2013).
Polygonaceae	<i>Polygonum nepalensis</i>	Tannins, steroids, proteins, carbohydrates, phenolic compounds, flavonoids amino acids, mucilages (Rakesh et al., 2011).	Abortion, swelling, hemorrhoids, diarrhea and as diuretic, antifungal, antiinflammatory, antiviral, hypotensive (Oliveira-Simoes et al., 1989; Maria et al., 2001).
Rhamnaceae	<i>Gouania longipetala</i>	Phenolics, reducing sugars, phytosterols, triterpenoids, saponins and flavonoids (Ekuadzi et al., 2012).	Wounds, venereal diseases, swellings, abdominal pain, antibacterial, and anti-inflammatory (Ekuadzi et al., 2012).
Solanaceae	<i>Physalis micrantha</i>	Tannins, sugars, proteins, minerals, flavonoids and vitamins (Chothani and Vaghasiya, 2012).	Analgesic, purgative, abortifacient, diuretic, vermifuge, tonic, appetizing, febrifuge, antigonorrheic, facilitate the expel of placenta during childbirth and antibacterian (Chothani and Vaghasiya, 2012).
	<i>Physalis peruviana</i>	Alkaloids, withanolides and flavonoids (El-Gengaihi et al., 2013).	Sedative, analgesic, malaria, hepatitis, dermatitis, diuretic, and antibacterian (Puentes et al., 2011; Zhang et al., 2013).
	<i>Solanum aculeatissimum</i>	Tannins (Omori et al., 2012).	Pains, diuretic (Li, 2006); diarrhea (Omori et al., 2012).
	<i>Solanum macrocarpon</i>	Alkaloids, saponins, tannins, flavonoids, phytosterols, reducing sugars, cardiac glycosides and phlobatannins (Sodipo et al., 2008).	Fever (Jiofack et al., 2010); skin infections, pains, constipation, weight reduction (Madukwe et al., 2013).
	<i>Solanum melongena</i>	Saponins, terpenes, tannins, flavonoid, phlobatannins, anthraquinones, cardiac glycoside, alkaloids (Eddy et al., 2010).	Pain, weight reduction (Jiofack et al., 2010).
Sterculiaceae	<i>Cola acuminata</i>	Alkaloids, phenols, tannins, flavonoids, saponins, cardenolides (Sonibare et al., 2009; Dewole et al., 2013).	Stimulant (Dewole et al., 2013); vomiting, malaria and fever (Odugbemi, 2006).
Urticaceae	<i>Laportea Ovalifolia</i>	Saponins, tannins, flavonoids, alkaloids, cardiac glycosides (Essiott et al., 2011).	Urinary problems, stomachache, diarrhea, wounds, poison, headache, blenorrhoea, swelling and diuresis (Essiott et al., 2011).
	<i>Cyphostemma adenocaula</i>	Carotenoids, xanthophylls, vitamin C, tocopherols and tocotrienols (Al-Duais et al., 2009).	Malaria, swollen abdomen, syphilis, abdominal pain and abortion (Bosch, 2004).
Vitaceae	<i>Cyphostemma vogelii</i>	Tannins and saponins (Udegbunam et al., 2013).	Analgesic and anti-inflammatory (Udegbunam et al., 2013).
	<i>Aframomum melegueta</i>	Alkaloids, flavonoids, tannins, saponins, steroids, cardiac glycosides and terpenes (Echo et al., 2012).	Threatened abortion, post-partum pains, post-partum contraction (Focho et al., 2009a, 2009b; Echo et al., 2012); driving away evil spirits (Simbo, 2010); métrorragie (N'Guessan et al., 2009).

*Kalanchoe crenata* which is indicated in the treatment of smooth muscle spasm (Ariwaodo et al., 2012) and also possess analgesic and anti-inflammatory effects (Dimo et al., 2006). The above therapeutic or pharmacological properties of the plant may clearly attest its highest frequency of utilization (36%) for the treatment of bleeding during pregnancy.

### 3.5. Pharmacological activities and major phytochemical compounds found in the plants as reported in the literature

As shown in Table 6, many pharmacological studies have already been undertaken on the majority of plants recorded in this survey. These plants are used in various parts of the world to treat large spectrum of illnesses. Most of them are used to treat health conditions associated to pregnancy and childbirth. They also contain numerous and diversified phytochemical compounds (Table 6).

A broad literature review on these medicinal plants shows that 80% of them are used in many Sub-Saharan Africa countries, and principally in Cameroon, for the same therapeutic effects (Focho et al., 2009a, 2009b, 2010; Jiofack et al., 2008, 2010; Agnem et al., 2011; Telefo et al., 2011; Njamen et al., 2013). These observations prove the similarity of knowledge on medicinal plants curing potential in Sub-Saharan African. The remaining plants (20%) are still used, in other parts of Africa, for the treatment of various pregnancy ailments. However, these ailments are different to those

indicated during our survey (Adjanohoun et al., 1988, 1996; Asongalem et al., 2008; N'Guessan et al., 2009; Echo et al., 2012). This diversity observed in the usage of some of these plants could be explained by the variations in their chemical composition depending on the regions from where they come. The differences in climate, soil or other ecological conditions in these localities could affect the chemical composition of the plant (Bep, 1986). The different uses can also be explained by the fact that, most of these plant species were multipurpose medicinal plants used in the treatment of several ailments (Focho et al., 2009b).

Pharmacological data on the therapeutic effects of some of these plants are abundant. Thus, *Aloe buttneri*, *Ocimum gratissimum*, *Sida corymbosa* and *Vernonia amygdalina* are proven to have contractile effects on uterine myometrial cells (Guemo, 2002; Attah et al., 2012) as well as analgesic, diuretic, and febrifuge potentials. Antifungal properties of *Oxalis corniculata* were shown (Badwaik et al., 2011). All these findings scientifically consolidate the beneficial effects of the recorded plants on pregnant women health conditions.

## 4. Conclusion

The results of our investigation show that the traditional use of plants during pregnancy and childbirth is still a well established practice in Menoua division in Cameroon. However it was noted that

some of these plants are used almost during all the pregnancy terms and at unlimited doses. Given the lack of information on the toxicological potential of many of them, such risky practices should be proscribed. Moreover, further research works centered on their efficacy, toxicology and pharmacological mechanisms of action, would provide insights that could help to raise and improve local pregnancy and childbirth care.

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