

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/28942> holds various files of this Leiden University dissertation

Author: Towns, Alexandra Maria

Title: Fertility and fontanel : women's knowledge of medicinal plants for reproductive health and childcare in western Africa

Issue Date: 2014-09-30

Chapter Three

Comparing local perspectives on women's health with statistics on maternal mortality: an ethnobotanical study in Bénin and Gabon

Alexandra M. Towns and Tinde van Andel

Published in *BMC Complementary and Alternative Medicine* 14: 113, 2014

Abstract

Background

According to the World Health Organization (WHO), reproductive health problems are the leading cause of morbidity and mortality for women in Africa. In spite of this scenario and the importance of plants in African health care, limited research has been conducted linking maternal health and plant-based medicine. The objective of our research was to examine how closely Beninese and Gabonese women's health perspectives, medicinal plant knowledge, and plant use practices reflect the statistical causes of maternal mortality.

Methods

In Bénin (2011) and Gabon (2012), we conducted 87 ethnobotanical questionnaires with the corresponding collection of 800 botanical specimens. We used free-listing analysis, citation frequency and species counts to determine women's top health concerns. We also interviewed 18 biomedical healthcare providers in national hospitals and local clinics.

Results

Informants' perceptions of the main causes of maternal suffering included malaria, infertility, and menstruation and pregnancy concerns. Women were knowledgeable on plants to treat the top causes of maternal morbidity, but knew more plants for conditions such as anemia, infertility, breast milk production, and the maintenance of menstruation and pregnancy. The biomedical staff recognized the role of traditional medicine in their patients' lives and expressed concern for herbal remedies to facilitate birth, but were restricted by national policies on advising on medicinal plant use.

Conclusions

Plants serve as an entry point to understanding Beninese and Gabonese women's perceptions of common health concerns and local health management strategies. Plant use practices in both countries did not closely parallel the top statistical causes of maternal mortality, but highlighted key issues such as menstruation and infertility as salient health concerns for women. More research is needed on the role of plants in women's gynecological healthcare.

Keywords

Gynecology; Herbal medicine; Maternal morbidity; Reproductive health; Infertility; Menstruation; Africa

Background

Gynecological morbidity is among the most severe health issues in the developing world (Horton 2010; UNFPA 2013). In Africa specifically, the major statistical causes of maternal mortality are hemorrhage (34%), sepsis/infections (10%), and hypertensive disorders (9%) (Khan et al. 2006; Kinney et al. 2010). These health conditions have contributed to the response of major international health organizations in creating the fifth goal of the United Nations Millennium Development Goals (MDGs): to improve maternal health by drastically reducing the maternal mortality ratio and achieving universal access to reproductive healthcare by 2015 (United Nations 2013). Although national governments in Bénin, West Africa and Gabon, Central Africa have signed on to the MDGs, and some progress has been acquired between 1990 and 2010, neither country is on track to meet its target for 2015 (UNDP 2012). In 2010, the maternal mortality ratio for Bénin was 350 per 100,000 live births and 230 per 100,000 live births in Gabon (WHO 2012).

In spite of these health conditions, and widespread international and national commitment to achieving improved reproductive health, little research has been conducted on the role of medicinal plants in African women's healthcare. This scenario is a startling contrast to the daily lives of Africans, as traditional medicine is the primary form of healthcare for 80% of the African population (WHO 2008). Even more notable is the lack of women's knowledge in ethnobotanical research (Pfeiffer and Butz 2005), in spite of the specialized knowledge women have on medicinal plants (Camou-Guerrero et al. 2007). Women depend largely on traditional medicine in rural areas, where health centers are poorly equipped (Kamatenesi-Mugisha and Oryem-Origa 2007; Pouliot 2011), but also urban areas, where biomedical treatment is offered in modern hospitals and health centers (Cocks and Dold 2006; Osamor and Owumi 2010). For over twenty years, doctors and anthropologists have expressed their concerns about the frequent use of herbs as menstrual inducers and vaginal drying agents in West Africa and Western Central Africa (Runganga and Kasule 1995; Brown and Brown 2000; Myer, Kuhn, and Stein 2005; Ngom 2000), yet medicinal plant use for reproductive health issues is still largely understudied (Njamen and Mvondo 2013; Abdillahi and Staden 2013).

What is missing from the current understanding of African women's health is how African women perceive and manage their own health (Harlow and Campbell 2000), particularly through their use of plants. Not only could documented plant use patterns identify the important plant species used in women's health, but also the health priorities and practices of urban and rural African women. The aim of this paper was to examine how closely African women's health perceptions, plant knowledge, and plant use practices parallel the statistical causes of maternal mortality prioritized by national governments and international organizations. Through analyzing women's knowledge and use of medicinal plants, we sought to understand local perspectives on women's health, considering the knowledge and use of medicinal plants to be indicators of how Beninese and Gabonese women manage their own health. We included the perceptions of local government and private healthcare providers in order to capture the local biomedical viewpoint. We posed the following questions: (1) *Among all plants used for women's health, how many are used to treat the statistical causes of maternal morbidity and mortality?* (2) *What percentage of plants is used to treat locally-determined reproductive health concerns not addressed by international health organizations?* (3) *How do local biomedical healthcare providers perceive the use of traditional plant-based medicines for women's health?* We expected plant use patterns to closely reflect the major maternal illnesses identified by international health organizations. Outcomes of this study can inform (inter) national health agendas in Bénin and Gabon, contribute to better understanding local medicinal practices, and serve as a starting point for further research on plant efficacy and safety with regard to maternal health.

Methods

Research ethics

The research team worked according to the Code of Ethics of the International Society of Ethnobiology (International Society of Ethnobiology 2006), and followed all research procedures and protocols at Naturalis Biodiversity Center and Leiden and Wageningen Universities. In Bénin, we obtained a formal invitation from the Faculté des Sciences Agronomiques, Université d'Abomey-Calavi, received formal approval and a research permit (# 041511) from the Faculté des Sciences et Techniques, Université d'Abomey-Calavi, and a plant export permit (#0000591) from the Service de la Protection des Vegetaux et du Control Phytosanitaire, Ministre de l'Agriculture, de l'Elevage et de la Peche. In Gabon, we received a letter of invitation (#176), formal approval, and research permit (#AR0028/12) from the Centre National de la Recherche Scientifique et Technologique (CENAREST), authorization to enter the National Parks (#000026) from the Agence Nationale des Parcs Nationaux (ANPN), and authorization (#00145, #00219) from the Institut de Phamacopee et de Medicine Traditionelles (IPHAMETRA) to export our botanical specimens. Given the ethnobotanical nature of our research, further ethical approval by a bioethics board was deemed not required by these institutions. All data were handled and stored anonymously.

Study area and sampling

Bénin, with a population of over 9.8 million people, is located in West Africa, between Nigeria and Togo (CIA 2013a). The main ethnic groups are Fon (39%), Adja (15%), and Yoruba (12%). According to the United Nations Development Program (UNDP), which bases its Human Development Index (HDI) on life expectancy, education, and income, Bénin is considered a country of "low human development" (UNDP 2013a). Its vegetation cover is mainly savanna (FAO 2010a). Gabon, located in Central Africa, borders the Atlantic Ocean at the Equator, between Republic of the Congo and Equatorial Guinea, and has a population of over 1.6 million people, mainly of Fang, Bapounou, Nzebi, and Obamba ethnic groupings (CIA 2013b). Gabon is considered by the UNDP to be a country of "medium human development" (UNDP 2013b). It is estimated that up to 80% of Gabon is covered with forest (Sosef et al. 2006). Both countries, although highly varied in population, level of human development, and vegetation cover, have populations that use traditional medicine as their primary form of healthcare.

The Bénin fieldwork took place between April and October 2011 in the six departments of Kouffo, Zou, Plateau, Ouémè, Atlantique, and Mono. We worked with the major ethnic groups represented in the country, mainly Fon and Yoruba people and related ethnicities. Research in Gabon began in June 2012 and concluded in December 2012, spanning the six departments of Estuaire, Woleu-Ntem, Haut-Ogooué, Ngounié, Moyen-Ogooué, and Ogooué-Ivindo. In Gabon, we worked with Bantu-speaking ethnic groups, namely the Fang, Mitsogo, Obamba, and Bapounou peoples. In each country, we started the data collection at the market, working with willing and knowledgeable herbal medicine saleswomen and then utilized snow-ball sampling to identify additional women in urban and rural communities.

Ethnobotanical questionnaires

By spending time at the markets and conversing informally with female merchants, we were able to identify local health concerns, commonly utilized species, and respected and knowledgeable collaborators. These activities enabled an emic approach to plants and healthcare and built the trust and mutual understanding necessary to collect data on sensitive information such as sexuality and fertility (Newing 2011). This information was used to develop an ethnobotanical women's reproductive health questionnaire, based on Alexiades' (Alexiades and Sheldon 1996) recommended guidelines

for collection of ethnobotanical information. The questionnaires were designed in English and then translated into Beninese and Gabonese French during each fieldwork phase. They consisted of (1) health issue free-listing exercises and (2) open-ended questions inquiring about herbal remedies (plant, use, preparation, and administration) used for statistical causes of maternal mortality and locally-determined health concerns. We conducted a total of 87 questionnaires, 46 in Bénin and 41 in Gabon. The Beninese informants were divided between 42 women and four men, and distributed between 23 market, 17 rural and six urban settings. The Gabonese participants were divided between 40 women and one man, and distributed between 30 rural, six market, and five urban settings. Men were included in the research as informants due to their recognition in their communities as having substantial knowledgeable on the use of plants in women's reproductive health issues. Participants received monetary compensation for their involvement in the research. Interpreters were employed in situations where participants did not speak French. After introducing ourselves and our research institute, closely explaining the nature of our research, and receiving verbal consent, we conducted the questionnaires in the participants' own surroundings.

Plant collection

Directly following each questionnaire, we accompanied informants into the surrounding areas to collect plant species mentioned in the interviews. For questionnaires completed with market sellers, we purchased the cited plant species directly from the market stalls. We used standard ethnobotanical collection methods (Alexiades and Sheldon 1996) to allow for an adequate taxonomic identification of the species, and the documentation of local names, recipes, and perceived effects. We collected over 800 plant vouchers and information on their medicinal uses (see Appendix 1 and Appendix 2). Vouchers of all collected plants were deposited at the main herbaria in each country (BEN in Bénin and LBV in Gabon), with a complete set of duplicates stored at the National Herbarium of the Netherlands (WAG), now merged with Naturalis Biodiversity Center.

Biomedical healthcare provider interviews

We interviewed a total of 18 (six in Bénin and 12 in Gabon) biomedical healthcare providers, including nurses, midwives, doctors, and gynecologists. The interviews took place at national hospitals in urban areas (Cotonou in Bénin and Libreville in Gabon) as well as government and private health clinics in rural communities. These semi-structured interviews included (1) free-listing of salient reproductive health problems, (2) questions related to culturally-bound disease concepts, (3) open-ended questions about practitioners' experiences with patients who utilized plant-based medicine prior to seeking biomedical care and (4) opinions on the benefits and risks of traditional medicine.

Data analysis

The ethnobotanical questionnaires were analyzed with three main indices. The first index was the number of times an illness was mentioned in the free-listing exercise. Each informant was asked to give her opinion on the top three health issues that caused the most suffering for women. Secondly, we calculated the knowledge frequency of the informants by averaging the number of citations for each health issue and the percentage of informants who knew at least one herbal remedy for each health condition. Lastly, we calculated the number of plant species cited per health issue, which captured informants' practices of treating diseases. The health issues with the most cited species were considered to be of high importance to the community, based on the principle that the greater importance of a health condition, the most plant species are used to treat it (van Andel et al. 2008; Milliken and Albert 1997; Ruyschaert et al. 2009; Milliken 1997). We summarized the responses of the local biomedical healthcare providers and selected key examples to illustrate their experiences with women who self-treated with medicinal plants prior to arriving at clinics and hospitals.

Results

Free-listing analysis

Malaria, pregnancy-related concerns, and infections were the most commonly mentioned health complaints by women in the Beninese free-listing activity (Table 1). Pregnancy-related conditions included a range of concerns such as avoiding miscarriage, managing early pregnancy sicknesses (stomachache, vomiting, and diarrhea), strengthening the fetus, and preparing for childbirth. The statistical causes of maternal health were not strongly reflected in the free-listing activity, with the exception of infections, which may not be directly correlated with the biomedical definition of sepsis. Post-partum hemorrhage ranked sixth among Beninese informants' concerns, tied with headache. Hypertension was mentioned by only two of the 46 informants.

Table 1 Frequency of women's health complaints cited by 46 informants in Beninese free-listing activity

Health issue	Frequency
malaria	0.46
pregnancy-related	0.33
infections	0.24
fever	0.20
infertility	0.20
menstrual-related	0.20

Menstrual-related concerns, stomachache, and infertility were the health complaints most frequently cited in the Gabonese free-listing activity (Table 2). Menstrual-related concerns included painful menstruation, black-colored menses, and heavy cramps. Like the informants in Bénin, women in Gabon did not perceive post-partum hemorrhage or high blood pressure as top concerns. Infections were mentioned by two of the 41 informants.

Table 2 Frequency of women's health complaints cited by 41 informants in Gabonese free-listing activity

Health issue	Frequency
menstrual-related	0.44
stomachache	0.41
infertility	0.22
backache	0.17
malaria	0.10
childbirth-related	0.10
worms	0.10

Informants' knowledge of herbal remedies

Beninese women were most knowledgeable on herbal remedies for pregnancy-related concerns, anemia, high blood pressure, and breast milk stimulation (Table 3). Herbal treatments were administered in pregnancy: (1) to strengthen and protect the fetus (26%), (2) to be consumed as nutritious (plant-based) foods (17%), (3) to prepare the body for delivery (15%), (4) to promote general health and well-being of the mother (13%), (5) to treat/prevent early first trimester illnesses (12%), (6) to treat malaria (6%), and (7) other (fatigue, stomachache, antibiotic, etc.) (11%). Herbal remedies for childbirth-related concerns were mainly reported to be used to facilitate childbirth, but also to assist in the removal of the placenta and for use as a post-birth womb cleanse. The majority of Gabonese women knew herbal remedies for breast milk stimulation, anemia, vaginal cleansing, and menstrual-related concerns (Table 3). Herbal remedies for facilitating childbirth were reported to be used beginning in the seventh month of pregnancy. Of the 41% of informants who knew a treatment for postpartum hemorrhage, half of these responses were for hot water massage, in which herbs were not involved.

Table 3 Informant knowledge on women's health issues in Bénin (46 questionnaires) and Gabon (41 questionnaires)

Health issue	# of citations	# of citations
	(% informants ¹)	(% informants ¹)
	Bénin	Gabon
anemia	62 (98%)	63 (88%)
breast milk stimulation	44 (85%)	78 (93%)
pregnancy-related	103 (98%)	60 (66%)
menstrual-related	65 (83%)	53 (76%)
high blood pressure	49 (87%)	43 (63%)
childbirth-related	70 (78%)	56 (66%)
vaginal cleanse	39 (67%)	64 (76%)
sexually transmitted infections	66 (83%)	13 (34%)
infertility	31 (67%)	39 (46%)
postpartum hemorrhage	37 (73%)	22 (41%)

¹percentage of informants with knowledge of at least one treatment

Health conditions with the most species

Beninese informants mentioned a total of 248 species for women's reproductive health (see Appendix 1). More species were cited for pregnancy and menstruation, 36% and 32% respectively, than for other health conditions, followed by anemia (25%) and infertility (23%) (Table 4). Informants mentioned species to treat menstrual-related concerns that concerned length (too long, delayed, irregular), pain (too heavy, too painful), texture (slimly, sticky), color (black, clear) and smell (too odorous). *Sarcocephalus latifolius* was frequently cited as an herbal tea remedy to treat menstrual complications (see Appendix 1).

Table 4 Number of species used per health condition in Bénin (46 questionnaires) and Gabon (41 questionnaires)

Health condition	# of species	# of species
	(% of 248 species)	(% of 189 species)
	Bénin	Gabon
pregnancy-related	90 (36%)	41 (22%)
menstrual-related	79 (32%)	28 (15%)
anemia	62 (25%)	21 (11%)
high blood pressure	39 (16%)	34 (18%)
infertility	58 (23%)	13 (7%)
vaginal cleanse	28 (11%)	37 (20%)
childbirth-related	38 (15%)	25 (13%)
breast milk stimulation	23 (9%)	29 (15%)
sexually transmitted infections	40 (16%)	13 (7%)
postpartum cleanse	28 (11%)	23 (12%)
postpartum hemorrhage	28 (11%)	12 (6%)

Gabonese informants mentioned a total of 189 species for women's health (see Appendix 2). Women used 22% of the herbal pharmacopeia for pregnancy, 20% for vaginal cleansing and 18% of species for high blood pressure (Table 4). Breast milk stimulation and menstruation followed, each with 15% of the total numbers of species. Gabonese participants commonly cited the use of the leaves of *Alchornea cordifolia* in direct vaginal insertion for a vaginal cleanse (see Appendix 2). Further analysis on the frequency of species mentioned in our study will be published elsewhere.

Perspectives of the local biomedical healthcare providers

The Beninese biomedical healthcare providers cited malaria most often as a health threat for pregnant women in the free-listing activity. The Gabonese healthcare providers cited sexually transmitted infections most frequently, followed by stomachache, malaria and infertility. They suggested a strong causal link between infertility and the high number of sexually transmitted infections and clandestine abortions. Biomedical staff in both countries recognized the role of traditional medicine in their patients' reproductive lives, and shared examples of both positive and negative effects. Doctors in Gabon praised the use of a post-partum hot water massage for mothers' recovery after childbirth. Staff in private clinics in Bénin mentioned that traditional healers were occasionally called into the clinic to assist in complicated births. However, severe negative effects were also reported, such as the combined use of traditional and modern medicine leading up to childbirth in Bénin. Doctors in Gabon described situations with patients who used plants to speed up contractions that eventually led to uterine rupture.

Although we did not find a strong pattern that biomedical healthcare providers viewed plant-based traditional medicines either negatively or positively for women's health, both sets of informants clearly conveyed that national policies did not authorize the use of traditional medicine in hospitals. These policies limited the amount of information they were able to share with their patients. They suggested that these restrictions influenced patients' willingness to discuss their plant use practices with them. Gabonese healthcare providers frequently expressed a concern for the lack of scientific documentation on the effects of medicinal plants and the lack of standard dosage in traditional medicine.

Discussion

Locally-perceived health issues

Malaria in pregnancy was commonly cited by women as a health concern in the free-listing activities as well as by the biomedical healthcare providers. International efforts to combat malaria are evidenced in the promotion of malaria prevention therapies for pregnant women by the WHO and the sixth goal of the MDGs (WHO 2013a; WHO 2013b). Biomedicine recognizes malaria as a serious health threat during pregnancy due to the increased risk of low birth weight and maternal and infant anemia (Eisele et al. 2012; Gutman and Slutsker 2011; Huynh et al. 2011; Fleming 1989). Although malaria is seen as a common concern by local women, local healthcare providers, and (inter) national health organizations, there is little attention from international organizations on the use of plants to treat malaria, especially for pregnant women. Informants in our study were careful to distinguish between plants used for general cases of malaria and those used for pregnant women with this disease. Recent pharmacological research has highlighted the role of medicinal plants in treating malaria in both countries (Yetein et al. 2013; Lekana-Douki et al. 2011), but more research is needed to understand the effects of medicinal plant use during pregnancy. We did not systematically ask about malaria in our questionnaires since we did not consider malaria to be a reproductive health issue at the time of designing our questionnaire. This oversight is likely reflected in the low number of plant species cited by informants and is also apparent in international gynecological health programs, as malaria is often not associated with reproductive health.

Menstrual complaints ranked high on the free-listing exercises of both sets of informants. The majority of women knew how to treat menstrual-related conditions and numerous plant species were cited as treatments. Menstruation itself was not considered an illness, but irregularities, pain, and variations in color and smell of blood were frequent concerns. Although not a priority in national or international women's health agendas, menstrual management has been identified as a priority issue by women across developing regions of the world (Harlow and Campbell 2000; Ten 2007; Bhatia et al. 1997). It has direct implications for not only hygiene and infections, but also for productivity and participation in society (Water Supply and Sanitation Collaborative Council 2013). Menstruation limits women's participation in traditional social functions in both Bénin and Gabon. Likewise, as has been documented in Tanzania, menstruation negatively impacts young women's ability to attend school, resulting in lower attendance and achievement (Sommer 2010). In Gabon, painful menstruation was linked in cultural terms to infertility. Beninese informants mentioned the correlation between heavy menstruation and anemia as a reason to regulate menstruation. Given the high value placed on fertility in most African societies (Caldwell and Caldwell 1987), regular menstruation serves as an indication that a woman can get pregnant; effective menstrual management secures future childbearing (Levin 2001).

Infertility was among the four most frequently mentioned reproductive health concerns by all women, and ranked high on the tables of participants' knowledge and plant species. Infertility, especially secondary infertility, has been documented as a reproductive health issue in Sub-Saharan Africa (Larsen 2000; Cates, Farley, and Rowe 1985), as well as a psychological and social concern (Dyer et al. 2002; Naab, Brown, and Heidrich 2013). It has been estimated that up to 30% of couples from sub-Saharan

Africa have primary or secondary infertility (Rutstein and Shah 2004); a 1983 study showed that 32% of Gabonese women remain childless and the end of the childbearing years, the highest of all African countries involved in the study (Frank 1983). Biomedical health providers in Gabon echoed informants' concerns of infertility and linked it to the high number of sexually transmitted infections and clandestine abortions. Their experiences were supported by a study in eastern Gabon, which found high levels of upper genital tract infections in infertile women (Collet et al. 1988). The prevalence of infertility has also been described in recent publications on the use of modern fertility treatments in developing country contexts (Daar and Merali 2002; Balen and Gerrits 2001). The WHO published a bulletin in 2010 on the issues facing women in the "infertility belt" of Africa, and called for more available and affordable fertility treatments (Cui 2010). Given expenses involved in modern fertility treatments and the social stigma against being infertile, plants offer women an affordable and private way of addressing this ailment (Telefo et al. 2011).

Infertility was also apparent in cultural-bound diseases mentioned by women in both countries. In Bénin, a culturally-bound disease known as a "loudjo" (Fon) was cited as a common case for infertility in which a woman's body rejects sperm. Gabonese participants described a cultural bound disease known as "ona" or "onyaboom" (Fang) caused by worms that rest in the womb and cause sterility. Three additional cultural bound diseases were mentioned in the Gabonese fieldwork (see Appendix 2), although they were not the focus of this manuscript, since they were only mentioned by one informant each. These cultural illnesses included "les urines" (Fang/French)- an infection characterized by frequent urination, "zchaw" (Fang)- a gynecological abnormality similar in description to fibroids and cysts, and "mfoes" (Fang)- an illness characterized by back pain. These diseases highlight local understanding of health and are important for biomedical healthcare providers to be aware of in order to have a comprehensive understanding of local healthcare (Sabuni 2007).

Pregnancy-related symptoms were common health concerns in both countries. It can be expected that pregnancy has many herbal treatments, due to the numerous stages over nine months in which a woman would seek healthcare. Maintaining a pregnancy and ensuring a safe birth are closely linked to the high social value of fertility (Caldwell and Caldwell 1987). The role of medicinal plants in pregnancy and childbirth has been reflected in other African countries and worldwide (de Boer and Lamxay 2009; Ticktin and Dalle 2005; Veale, Furman, and Oliver 1992; Malan and Neuba 2011).

Breast-milk stimulation was a common concern for Gabonese informants. The cultural importance of breast milk in Africa is well documented (Davies-Adetugbo 1997; Hofmann et al. 2009; Yeo et al. 2005). While the WHO does not mention breast milk-related problems in their programming, concerns of inadequate breast milk quantity are a common concern for women worldwide and cited as a reason for not fulfilling the WHO guidelines of six months of exclusive breastfeeding (WHO 2013c). Shared breastfeeding has been reported as common practice among women in Gabon, with estimates of up to 40% of women engaging in the practice (Ramharter, Chai, and Adegnika 2004).

Statistical top causes of maternal mortality

Informants in our study did not report the top statistical causes of maternal morbidity and mortality as their most urgent gynecological health concerns. However, over three-fourths of the Beninese informants knew an herbal remedy for treating both high blood pressure and post-partum hemorrhage. Nearly half of the Gabonese informants knew at least one treatment for post-partum hemorrhage and 63% of the women knew plants used to treat high blood pressure. Although further research is needed in order to make more substantial claims, the relative low number of plants cited in our study for postpartum hemorrhage, in particular Gabon, may be reflected in the high rates of maternal mortality associated with hemorrhage. This case reflects a situation where biomedical solutions may be urgently needed in order to improve maternal health in Africa (Prata et al. 2005). Some informants were not

familiar with hypertension, which is an area where health programs efforts also should improve their educational efforts. It was also not clear whether informants' concepts of high blood pressure matched biomedical definitions of the illness.

Sepsis, the third most common cause of maternal morbidity and mortality, is a health issue that has not been clearly-defined in health programs worldwide. Many reports suggest that the burden of sepsis on morbidity and mortality are largely underreported (Seale et al. 2009; Jawad, Lukšić, and Rafnsson 2012; Bruijns, Green, and Wallis 2012). Infections, both general and sexually-transmitted, were mentioned by both sets of informants, but sepsis as a distinct category was not cited. It is possible that sepsis is reflected in the numerous recipes and plants used for vaginal cleansing and uterus cleanses. In Gabon especially, vaginal cleanses were a common health practice, with 76% of informants knowledgeable on herbal treatments. Although these cleanses may not be directly associated with sepsis or infections, they may have a role in either preventing vaginal infections or increasing infections by disturbing vaginal flora. Although some research has explored the role of intravaginal practices in increased HIV infections (Runganga and Kasule 1995; Brown and Brown 2000; Myer, Kuhn, and Stein 2005; Low et al. 2011), more research is needed to draw further conclusions on the role of vaginal cleansing in women's reproductive healthcare, and more generally sepsis and infections.

The statistical causes of maternal mortality were also not reported by the local biomedical staff as urgent gynecological health concerns. This outcome could be explained by the generalized nature of African maternal mortality statistics (Khan et al. 2006; Kinney et al. 2010), which may not accurately reflect the health status of the populations with which we worked. The reliability of these numbers as an accurate measure of a population's health also comes into question, as recent literature on African economic statistics has proposed (Jerven 2009). The differences in perspectives nevertheless highlight key conceptual differences on well-being, health, and illness. Awareness of these differences can improve healthcare for African women by enhancing educational efforts and designing health initiatives that are culturally-appropriate to local communities.

Key insight from local healthcare providers

The local doctors, midwives, and gynecologists embody the biomedical perspective on the local level. They work at the interface between the local women's practices and perceptions and the biomedical science promoted in government hospitals and clinics. The biomedical staff in our study recognized the role of plant-based traditional medicine in their patients' lives, including the benefits and the risks, but were unable to make recommendations or offer medical advice due to the lack of documentation on plants' effects and the restrictions of national health policies. Local biomedical staff are uniquely positioned at the intersection of the two medical systems (Langwick 2008), a role that deserves further research and analysis in order to understand how the pluralistic medical system can better serve women in Africa.

Strength and weakness of our research

Our methodology of using three indices to capture the perceptions, knowledge, and plant use patterns enabled a triangulation of the most salient health concerns for the informants involved in this study. While we are confident that our results reflect the views of those individuals involved in our research, both countries have diverse ethnicities whose knowledge and perceptions were not represented in this study. Additional studies are needed to avoid generalizing our results to the entire female Beninese and Gabonese populations and to address differences in health perceptions between ethnic groups. Likewise, our use of snowball sampling resulted in uneven numbers of women from urban, rural, and market settings and the knowledge of several men. Our aim was not to make comparisons between marketplaces and rural and urban settings, but to capture local women's perceptions and routine practices. Five men were included in the study since they were recognized in their communities as being knowledgeable on plants used for women's reproductive health. Although we did not have a large

enough sample to make a statistical comparison, we found that men often had specialist knowledge on issues such as female infertility and complicated births. Future research can investigate differences in knowledge between the sexes and among varied settings.

Conclusion

In the diverse settings of Bénin and Gabon, plants serve as an entry point to understanding salient gynecological concerns and common health practices. Plants and women's knowledge contribute to the local population's management of the top statistical causes of maternal mortality, but other health conditions such as menstruation and infertility were more salient health concerns. Echoing the stances of the biomedical staff of both countries, more research is needed on the role of plants in women's gynecological healthcare. A renewed commitment to strengthening national policies on traditional medicine could improve the health services offered to women, helping to avoid the adverse effects of combing both systems, and further realize the goal of African women and (inter) national health programs alike of reducing maternal morbidity and mortality.

Abbreviations

MDGs, Millennium development goals; BEN, National Herbarium of Bénin; LBV, National Herbarium of Gabon; WAG, Former Wageningen University branch of the National Herbarium of the Netherlands, now merged with Naturalis Biodiversity Center; WHO, World Health Organization

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

AMT carried out the ethnobotanical questionnaires, conducted the biomedical health care provider interviews, collected and identified the plants, analyzed the data, and drafted the manuscript. TvA conceived of the study, acquired funding, participated in its design and coordination, helped to identify the plants, and helped to draft the manuscript. Both authors read and approved the final manuscript.

Authors' information

AMT is a PhD student at Leiden University, Naturalis Biodiversity Center in the Netherlands. TvA is a postdoc researcher at Leiden University, Naturalis Biodiversity Center in the Netherlands.

Acknowledgements

This research was made possible financially through the Netherlands Organization for Scientific Research (NWO), Vidi grant nr. 864.09.007. For the Bénin fieldwork, we would like to thank the professors at the University of Abomey-Calavi in Bénin, especially Akoegninou A and Sinsin B, along with the staff of the National Herbarium of Bénin (BEN). We would like to thank the Association des Sages-Femmes du Bénin, Aguessy H and l'Institut de Développement et d'Echanges Endogènes (IDEE), Ruyschaert S, Ostertag K, and Bouraima R for their assistance in the Bénin fieldwork. The Gabon fieldwork was supported by the research staff at L'Institut de Pharmacopée et de Médecine Traditionnelles (IPHAMETRA), the National Herbarium of Gabon (LBV), Bourobou HB, le Centre National de la Recherche Scientifique et Technologique (CENAREST), and the Agence Nationale des Parcs Nationaux (ANPN) in Gabon. The authors would like to share a special thanks to van Vliet E, Eyi Ndong H, Eyi S, Ongoda JP and Ndombi OI, as well as the midwives and gynecologists at the Centre Hôpital Universitaire de Libreville (CHUL). In the Netherlands, we would like to thank Sosef M for his logistical support, and the expert botanists at the National Herbarium of the Netherlands (WAG) for their assistance with plant identification. We are grateful to Vandebroek I and De Gezelle J for their review of this manuscript.

Appendix I

Species cited in 46 women's health questionnaires in Bénin: scientific botanical name, name in local language(s), used plant part, preparation, use category and AMT collection number

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT ^{#d}
<i>Abrus precatorius</i> L.	degbeybegbey (F), yekpeyekpeman (F), viviman (N)	root, leaves	T	contraception, infertility, pregnancy	NC
<i>Acacia nilotica</i> (L.) Delile	bonni (F)	seeds	T	menstruation	338
<i>Acanthospermum hispidum</i> DC.	togbama (M), kpononmi (N)	plant, leaves	T	HBP, infertility, pregnancy	376, 381, 535
<i>Acmella caulirhiza</i> Delile	awlekepeke (S)	plant	T	postpartum hemorrhage	397
<i>Acridocarpus smathmannii</i> (DC.) Guill. & Perr.	gbanguinan (F)	root, bark	T	anemia	300, 355, 599
<i>Acrostichum aureum</i> L.	Sofoco (S)	leaves	T	pregnancy	NC
<i>Aframomum melegueta</i> K.Schum.	atakoun (F)	fruit	T	childbirth, galactagogue, menstruation, STIs	309
<i>Afelia africana</i> Pers.	aguakpogoto (F)	bark	VW	STIs	362
<i>Aganope subhmannii</i> (Taub.) Adema	siensiendo (F)	root, bark	T	infertility, menstruation	NC
<i>Agelaea pentagyna</i> (Lam.) Baill.	ahouanhazou (S)	leaves	T	pregnancy	383
<i>Albizia adianthifolia</i> (Schum.) W.Wight	awagotingoto (F)	bark	T	menstruation	369
<i>Allium cepa</i> L.	petite onion (Fr)	stem	V, T, VW, A	galactagogue, HBP, infertility, menstruation, postpartum infections	117
<i>Allium sativum</i> L.	aiyo (G)	stem	T, D	childbirth, cysts, fibroids, HBP, menstruation	NC
<i>Aloe macrocarpa</i> Tod.	alocs (M)	leaves	J	anemia	487
<i>Antpelocissus leonensis</i> (Hook.f.) Planch.	rekle (N)	plant	T	infertility, pregnancy	320
<i>Anacardium occidentale</i> L.	cadjou (F)	bark, leaves, root	T, VW, HB	HBP, infertility, STIs, postpartum infections, pregnancy	331
<i>Ananas comosus</i> (L.) Merr.	ananas (Fr)	fruit	T	anemia	NC
<i>Anchomanes cf. difformis</i> (Blume) Engl.	agohouhè do (F)	root	T	infertility	315
<i>Annickia polycarpa</i> (DC.) Setten & Maas	atahé (F)	bark	T	menstruation	NC
<i>Annona muricata</i> L.	shapshap (F)	leaves	T	HBP, STIs	NC
<i>Annona senegalensis</i> Pers.	nyuglo (F), bejunongley (M), tineybo (T)	leaves, root	E, P, T	childbirth, STIs, pregnancy	602, 644
<i>Anthocleista</i> sp.	clabalabagoro (F)	bark	T	intestinal cleanse	523
<i>Anthocleista vogelii</i> Planch.	goroundo (F)	root, leaves, wood	T	infertility, intestinal cleanse, stomachache	348
<i>Arachis hypogaea</i> L.	arachide (Fr)	seeds	E	galactagogue, pregnancy	NC
<i>Argemone mexicana</i> L.	wetcheyon (G)	leaves	T, VW	pregnancy, STIs, vaginal cleanse	NC

Botanical Name	Local Name ^e	Used part	Preparation ^b	Use category	AMT ^{#d}
<i>Artocarpus cf. altilis</i> (Parkinson ex F.A.Zorn) Fosberg	bléfutu asu (M)	leaves	T	HBP	NC
<i>Asteraceae</i> sp.	atentebe (T)	plant	T	stomach ache	292
<i>Azadirachta indica</i> A.Juss.	kini (F)	leaves	T	abortion, pregnancy, stomachache	NC
<i>Baphia nitida</i> Lodd.	sokpèkpè (F)	wood	T, A	contraction, cysts, fibroids, intestinal cleanse, menstruation, postpartum cleanse	319
<i>Barteria cf. nigritana</i> Hook.f.	oko goto (F)	bark		anemia	NC
<i>Baobab thommingii</i> Schum.	kloman (F), bammo (T)	leaves	E, T	pregnancy, HBP	647
<i>Beta vulgaris</i> L.	la betterave (Fr)	root	E	anemia	NC
<i>Bignonia cf. unijugata</i> Baker	agboviawondo (N)	bark	T	intestinal cleanse	NC
<i>Boerhavia erecta</i> L.	trikpatikpalala (T)	leaves	E	pregnancy	298
<i>Bridelia ferruginea</i> Benth.	houssoukokoé (F)	root, leaves, bark	T, A, VW	anemia, contraception, infertility, menstruation, postpartum infections, STIs, vaginal cleanse	NC
<i>Bryophyllum pinnatum</i> (Lam.) Oken	aftiman (S)	leaves	T	postpartum cleanse	NC
<i>Burkea africana</i> Hook.	atapa (T)	leaves	E	pregnancy	646
<i>Caesalpinia bonduc</i> (L.) Roxb.	adjikuiiman (F)	seeds, leaves, root	D, E, T, W	childbirth, diuretic, infertility, menstruation, postpartum bleeding, postpartum cleanse, postpartum infections, pregnancy, STIs, vaginal cleanse	484, 651
<i>Caesalpinia pulcherrima</i> (L.) Sw.	orgueil de chine (Fr)	fruit (young), leaves, bark	T, P	HBP, infections	480
<i>Cajanus cajan</i> (L.) Millsp.	ewotini (N)	leaves	T	menstruation	NC
<i>Caladium bicolor</i> (Aiton) Vent.	wèkènoukoum (F)	plant	TC	menopause cause	568
<i>Calotropis gigantea</i> (L.) Dryand.	kpinto (F)	leaves	T	cough	NC
<i>Canna cf. indica</i> L.	sidakin (G)	plant	T	STIs	NC
<i>Capsicum annuum</i> L.	piment (Fr)	fruit	T, P, EN, A	cysts, fibroids, hemorrhoids- internal, HBP; intestinal cleanse	256
<i>Carica papaya</i> L.	kpinman (F;G)	leaves, fruit, root	T, D	anemia, galactagogue, infertility, contraception, cysts, fibroids, HBP; pregnancy, menstruation, vaginal cleanse	NC
<i>Carissa spinarum</i> L.	ahouanzodo (F)	root	T, VW, A	anemia, cysts, fibroids, menstruation, postpartum infections, STIs	332, 373, 504, 524
<i>Cassipouira filiformis</i> L.	agbégékán (F)	plant	T, VW	pregnancy, vaginal cleanse, infertility	326
<i>Ceiba pentandra</i> (L.) Gaertn.	kpatindèhoum (F), batidenia (M)	leaves	D	childbirth	567
<i>Cedrosia cf. argentea</i> L.	soman (G)	leaves	T	anemia	NC
<i>Celtis cf. zenkeri</i> Engl.	agbohingla (S)	bark	T	cysts, fibroids	NC
<i>Ceratophora sesamoides</i> Endl.	komokuile (T), agboma (F)	leaves, whole plant	D, E, T	anemia, childbirth, pregnancy	655

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category	AMT [#]
<i>Chamaecrista mimosoides</i> (L.) Greene	kilafimiche (S)	plant	VW	STIs	389
<i>Chamaecrista rotundifolia</i> (Pers.) Greene	azima (F, G)	leaves, whole plant	VW, T	infertility, pregnancy, STIs	NC
<i>Chassalia kolly</i> (Schumach.) Hepper	djétindo (F)	root	T	childbirth, intestinal cleanse, cysts, fibroids, menstruation	187, 328
<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	agatou (F, G, N)	leaves	T, VW	vaginal cleanse	NC
<i>Chrysophyllum albidum</i> G. Don	azongogoto (G)	bark	T	galactagogue	NC
<i>Chrysopogon</i> sp.	rékanwannon (F)	plant	T	menstruation	339
<i>Cissampelos macronata</i> A.Rich	djokodje (K)	leaves	T	postpartum hemorrhage	515
<i>Cissampelos macronata</i> A.Rich.	djokodje (F, G)	leaves, whole plant	T	infertility, CBD loudjo, infertility, menstruation, pregnancy	314
<i>Cissampelos ouariensis</i> P.Beauv. ex DC.	tjokodje (F)	leaves	D	infertility, pregnancy	NC
<i>Cissus populnea</i> Guill. & Perr.	dédo (F)	root	D	childbirth	122
<i>Citrullus colocynthis</i> (L.) Schrad.	tchégba (F), kaka (T)	leaves, seeds, fruit	E, T	STIs, intestinal cleanse, pregnancy	238, 303
<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai	wanyiwanyikoun (F)	fruit	T	intestinal cleanse	505
<i>Citrus aurantiifolia</i> (Christm.) Swingle	clé (F, G)	leaves, fruit, root	E, EA, T	childbirth, galactagogue, HBP, intestinal cleanse, menstruation, pregnancy, breast inflammation, postpartum cleanse, postpartum infections, infertility	345
<i>Citrus</i> sp.	kléman (F)	leaves, root, fruit	T	HBP, menstruation, pregnancy, intestinal cleanse, menstruation, stomachache	347
<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	gbozohoun (F)	leaves, bark, root	VW, T	menstruation, postpartum infections, STIs	330, 576
<i>Cleistanthus patens</i> (Benth.) Engl. & Diels	hounsoué do (F, G, N)	bark, leaves, root	T	infertility, intestinal cleanse, pregnancy	375
<i>Cleome viscosa</i> L.	agatouma (F)	plant	VW	STIs	NC
<i>Cnestis ferruginea</i> Vahl ex DC.	akpalfo (F)	seeds, root	T	menstruation, anemia	340
<i>Cochlospermum planchonii</i> Hook.f. ex Planch.	betou (T)	leaves	E	pregnancy	656
<i>Cocos nucifera</i> L.	agodo (F, G, N)	fruit, root, seeds, fruit water	D, T	anemia, galactagogue, cysts, fibroids, HBP, yellow fever, menstruation	370, 378
<i>Combretum cf. grandiflorum</i> G. Don	adounsitoman (G, S)	leaves	D, T	childbirth, infertility	NC
<i>Commelina erecta</i> L.	tchankoko (F)	rhizome	T	menstruation	334
<i>Corchorus olitorius</i> L.	krenkren (F)	leaves, root	E, T	food, menstruation	166
<i>Costus lucamianus</i> J.Braun & K.Schum.	tetregoudou (G)	plant	T	cysts, fibroids	372
<i>Costus</i> sp.	tetregouman (S)	leaves	T	intestinal cleanse, vaginal cleanse	NC
<i>Cratava adansonii</i> DC.	hontonzonzouin (F)	leaves	T, VW	HBP, menstruation, STIs, vaginal cleanse	NC
<i>Crescentia cujete</i> L.	kamma (F)	leaves	D	intestinal cleanse	NC
<i>Croton gratissimus</i> Burch.	jelele (F)	leaves, bark, root	T, P	CBD loudjo, childbirth, HBP, menstruation, pregnancy	327
<i>Cucumeropsis cf. mannii</i> Naudin	goussitchégba (F, G)	seeds	T	infertility, intestinal cleanse, menstruation	NC
<i>Curculigo pilosa</i> (Schumach. & Thonn.) Engl.	ayote (F)	tuber	V, D, T	galactagogue, intestinal cleanse, menstruation	118, 333

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category	AMT ^{#d}
<i>Carum sp.</i>	chyaoumkoko (F)	rhizome		infections	196
<i>Cyanthillium cinereum</i> (L.) H. Rob.	hunsikusey (F)	plant, leaves	T	CBD loudjo, contraception, pregnancy,	540, 595
<i>Cymbopogon citratus</i> (DC.) Stapf	teeman (F, N)	leaves	T	anemia, childbirth, galactagogue, pregnancy, stomachache	NC
<i>Cynometra megalophylla</i> Harms	bougoto (F, N, G)	bark	T	anemia	NC
<i>Daniellia oliveri</i> (Rolfe) Hutch. & Dalziel	nyado (F), inya (T)	leaves, bark, wood	E, D, HB, P	pregnancy, galactagogue, infertility	584, 652
<i>Desmodium gangeticum</i> (L.) DC.	zédali (F, N, G)	leaves, whole plant	T, D	childbirth, infertility, pregnancy	316
<i>Desmodium velutinum</i> (Willd.) DC.	bandowo (F, N, G)	leaves, whole plant, fruit	T, VW	CBD loudjo, HBP, menstruation, pregnancy	250, 508
<i>Dialium guineense</i> Willd.	loma (M)	leaves	D, E	galactagogue, intestinal cleanse, vegetable	481
<i>Dichapetalum madagascariense</i> Poir.	gbago (F)	leaves	T	cysts, fibroids, HBP, pregnancy, menstruation	142, 169
<i>Diodelia sarmentosa</i> (Sw.) Bacigalupo & Cabral ex Borhidi	séhi (F, G)	plant, leaves	T	infertility, menstruation, pregnancy	317, 528
<i>Dioscorea sp.</i>	gando (F)	root, fruit	T	cysts, fibroids, menstruation, anemia	357
<i>Dyosphania ambrosioides</i> (L.) Mosyakin & Clemons	godo (F), amantrouzou (F)	plant, leaves	EA, VW, T	menstruation, postpartum infections, STIs, vaginal cleanse	479, 519
<i>Ehretia cymosa</i> Thonn.	mionman (F), bodomey (T)	leaves	E, T	menstruation, pregnancy, HBP	380, 657
<i>Elaeis guineensis</i> Jacq.	l'huile rouge (Fr)	seeds, oil from seeds, inflorescence, leaves	E, EA, HB, T	galactagogue, internal hemorrhoids, HBP, muscle pain, fatigue, pregnancy	578
<i>Eleusine indica</i> (L.) Gaertn.	akpi (K)	leaves	D	childbirth	513
<i>Entada africana</i> Guill. & Perr.	kpkpassoumehaman (S)	leaves	T	contraception	394
<i>Entada gigas</i> (L.) Fawc. & Rendle	gbagbara (F)	seeds, bark	T	infertility, pregnancy	NC
<i>Erythrina senegalensis</i> DC.	pbaklesido (F)	bark, root	T	anemia, contraception, infertility, menstruation pregnancy	131, 527
<i>Fabaceae sp.</i>	fonvi (S)	plant	T	menstruation	NC
<i>Ficus sur</i> Forssk.	agpoto (T)	root, leaves	T	anemia, pregnancy	293, 388, 510, 653
<i>Flacourtia indica</i> (Burm. f.) Merr.	gbouhouncadjè (F)	root, leaves	T, D	anemia, pregnancy	127, 356
<i>Flacourtia sp.</i>	gbougbadjo (G)	wood	T	intestinal cleanse	371
<i>Flueggea virosa</i> (Roxb. ex Willd.) Royle	rcheke-rcheke (F)	leaves	T	fever, intestinal cleanse, malaria, pregnancy	193
<i>Fulvifomes cf. faustus</i> (Lév.) Bondartseva & S. Herrera	chutin (F)	fungus	T	infertility	123
<i>Ganoderma sp.</i>	djouatin (F)	fungus	T	pregnancy	NC
<i>Garcinia kola</i> Heckel	ahowo (G)	wood	T	menstruation	368
<i>Garcinia sp.</i>	kola (F)	bark, seeds	T, E	anemia	NC
<i>Gardenia ternifolia</i> Schumach. & Thonn.	adakpla (F)	plant, root, leaves	T	HBP, malaria, pregnancy	301, 510, 521, 564
<i>Gladiolus dalenii</i> Van Geel	baka (F)	stem	T	menstruation	335

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category	AMT ^{#d}
<i>Gmelina arborea</i> Roxb.	fofitin (F)	leaves	T	HBP	359
<i>Gomphrena celosoides</i> Mart.	papatajè (K)	plant	T	HBP	516
<i>Gossypium barbadense</i> L.	tchekey	plant			612
<i>Gossypium hirsutum</i> L.	avokanfochekey (F)	leaves	D, T	anemia	NC
<i>Grewia cf. carpinifolia</i> Juss.	oriman (G)	leaves	T	pregnancy	NC
<i>Gymnosporia senegalensis</i> (Lam.) Loes.	yedoman (F)	leaves, bark	T	cysts, fibroids	NC
<i>Heliantbus</i> sp.	botiowo (T)	leaves	EN	intestinal cleanse	278
<i>Heliotropium indicum</i> L.	koklusu danpaja (M)	plant, leaves	D, T	childbirth, HBP	522
<i>Heterotis rotundifolia</i> (Sm.) Jacq.-Fél.	hèhèman (F)	leaves, bark	T, D, VW	anemia, childbirth, cysts, fibroids, HBP, infertility, menstruation, pregnancy, protection against sorcery, postpartum infections, STIs	NC
<i>Hibiscus acetosella</i> Welw. ex Hieron	podèy (M)	leaves	T	anemia	151
<i>Hibiscus sabdariffa</i> L.	bissap (Fr)	leaves	T	cysts, fibroids, pregnancy	485
<i>Hibiscus surattensis</i> L.	kpoñin (F, G, N)	plant, leaves	T	anemia, infertility, pregnancy	150, 310, 503
<i>Hymenocardia acida</i> Tul.	feféya (T), orukpa (T)	leaves	E	pregnancy	641, 649
<i>Hyptis suaveolens</i> (L.) Poir.	kulubi (T)	leaves, root	E, T	galactagogue, STIs, pregnancy, stomachache	275, 536
<i>Imperata cylindrica</i> (L.) Raeusch.	cekunu (F), eweekan (N)	leaves	VW	pregnancy, vaginal cleanse	NC
<i>Indigofera hirsuta</i> L.	zoghèyzi (M)	leaves	T	pregnancy	170
<i>Indigofera pulchra</i> Willd.	azima (F)	plant	T	pregnancy	614
<i>Ipomoea aquatica</i> Forssk.	ahinandje (S)	plant	T	postpartum hemorrhage	399
<i>Ipomoea batatas</i> (L.) Poir.	patat douce (Fr)	leaves	T	contraception	NC
<i>Fruingia gabonensis</i> (Aubry-Lecomte ex O'Rorke) Baill.	bègbègma (M), asroma (M)	leaves	T	diarrhea, dysentery, hemorrhoids	482
<i>Jatropha curcas</i> L.	yinkpotin (N), ewekporo (N)	leaves	T, HB, VW	anemia, HBP, malaria, menstruation, stomachache	263, 483
<i>Jatropha gossypifolia</i> L.	yokpotinmannovo (N)	root	T	anemia	353, 572
<i>Justicia flava</i> (Vahl) Vahl	tchoutchougbourchou (F, S)	leaves, whole plant	T	anemia, menstruation	393
<i>Khaya senegalensis</i> (Desv.) A. Juss.	zouzou (F), kasesral (F)	bark, leaves	A, T, D, HB, VW	abortion, anemia, cysts, fibroids, HBP, infertility, menstruation, postpartum cleanse, postpartum infections, pregnancy, STIs, stomachache, vaginal cleanse	121, 284, 526
<i>Kigelia africana</i> (Lam.) Benth.	gnanbliko (F)	leaves, bark, fruit	E, A, T	breast inflammation, cysts, fibroids, infertility, intestinal cleanse, menstruation, stomachache	249, 342, 396
<i>Lansea acida</i> A. Rich.	akou (T)	bark	T	anemia	282
<i>Lansea barteri</i> (Oliv.) Engl.	houmansitékannon (F)	bark, leaves	T	anemia, menstruation	351
<i>Lantana camara</i> L.	hatchayo (F)	leaves, whole plant	T, VW	postpartum infections, STIs, vaginal cleanse	NC
<i>Laportea aestuans</i> (L.) Chew	kesukesu (F)	plant	T	menstruation	111
<i>Lippia multiflora</i> Moldenke	yinya (F)	leaves	T, VW	cysts, fibroids, STIs, vaginal cleanse	311

Botanical Name	Local Name ^e	Used part	Preparation ^b	Use category	AMT ^{#d}
<i>Lippia</i> sp.	agjala (F)	leaves	T, VW	HBP, menstruation, postpartum infections, STIs, vaginal cleanse	NC
<i>Lycopodiella cernua</i> (L.) Pic. Serm.	hingble (F, S)	plant	P, T	childbirth, pregnancy	132
<i>Mallotus oppositifolius</i> (Geiseler) Müll. Arg.	adjji (T), cecewima (M)	plant, leaves	E, T	intestinal cleanse, postpartum cleanse, postpartum infections	168
<i>Mangifera indica</i> L.	amangagoto (F, G, N)	leaves, bark	HB, T	anemia, pregnancy	191, 382
<i>Manihot esculenta</i> Crantz	kootema (F)	leaves	D	anemia	NC
<i>Melaleuca leucadendra</i> (L.) L.	kptomansin semeton (S)	leaves	D	childbirth	395
<i>Merremia tridentata</i> (L.) Hallier f.	fakale (G)	leaves	T	infertility	NC
<i>Millettia excelsa</i> (Welw.) C.C.Berg	lokoma (F)	leaves	T	contraception	NC
<i>Millettia thonningii</i> (Schum. & Thonn.) Baker	assandjouman (S)	leaves	T	postpartum hemorrhage	398
<i>Millettia thonningii</i> (Schum. & Thonn.) Baker	assoinssoin (F), orietie (G, N)	leaves, bark	T	anemia, galactagogue, infertility, intestinal cleanse, pregnancy, vaginal cleanse	501
<i>Mimosa quadrivalvis</i> var. <i>leptocarpa</i> (DC.) Barneby	ahossiboasa (F)	leaves	T, D	HBP, childbirth, HBP, pregnancy	302, 581
<i>Mitragyna inermis</i> (Willd.) Kuntze	lagpatima (M)	leaves	T	STIs	171
<i>Momordica charantia</i> L.	gninsinkin (F)	plant, fruit, leaves	EA, E, T, VW	abortion, anemia, contraception, HBP, intestinal cleanse, postpartum infections, STIs, pregnancy, vaginal cleanse	361
<i>Monodora myrsitica</i> (Gaertn.) Dunal	sassalkoun (F)	bark, seeds	A, T, V, VW	anemia, galactagogue, infertility, menstruation, postpartum infections, STIs	119, 184, 308
<i>Morinda lucida</i> Benth.	koinsido (F)	leaves, root, bark	A, T	abortion, anemia, contraception, cysts, fibroids, intestinal cleanse, postpartum cleanse, menstruation	112, 321
<i>Moringa oleifera</i> Lam.	kpatiman (F, G), patovide (M)	leaves, bark	E, P, T, VW	childbirth, cysts, fibroids, HBP, STIs, pregnancy	NC
<i>Newbouldia laevis</i> (P.Beauv.) Seem.	dèssèsièma (F), akoko (N)	leaves	T, D	anemia, HBP, pregnancy	NC
<i>Nicotiana</i> cf. <i>tabacum</i> L.	azoma (F)	leaves	V	galactagogue	NC
<i>Ocimum americanum</i> L.	hissihissi (F)	plant, leaves	T, HB, VW	postpartum infections, pregnancy, STIs, vaginal cleanse	701
<i>Ocimum basilicum</i> L.	kesukesu (M)	leaves	T	menstruation	143
<i>Ocimum gratissimum</i> L.	tchayo (F, G), koumoba (T)	leaves, whole plant	D, T, VW, HB	anemia, breast milk purifier, contraception, intestinal cleanse, menstruation, postpartum cleanse, postpartum infections, pregnancy, STIs, vaginal cleanse	NC
<i>Ocimum</i> sp.		plant, leaves	E, EA, T, D, VW	anemia, fatigue, HBP, infertility, intestinal cleanse, menstruation, muscle pain, postpartum infections, pregnancy, STIs, vaginal cleanse, vaginal infections	NC

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category	AMT [#]
<i>Olex subscorpioidea</i> Oliv.	mitindo (F, G, N)	root	T	cysts, fibroids, infertility, intestinal cleanse, menstruation	329
<i>Oldenlandia affinis</i> (Roem. & Schult.) DC.	ahonhou (F, G)	plant, leaves	T	childbirth, infertility	206, 313
<i>Parinari curatellifolia</i> Planch. ex Benth.	iyafa (T)	leaves	E	pregnancy	650
<i>Parkia biglobosa</i> (Jacq.) G.Don	ahouagoro (F)	leaves, bark, seeds	T, D, P, EN	hemorrhoids-internal, HBP, postpartum cleanse	384
<i>Paullinia pinnata</i> L.	hedoulifindo (F)	root, leaves	A, E, D, T, VW	anemia, contraception, HBP, menstruation, pregnancy	125
<i>Pavetta corymbosa</i> (DC.) F.N. Williams	Johou (F)	root, leaves	D, T, VW	infertility, pregnancy, vaginal cleanse	312
<i>Pennisetum cf. glaucum</i> (L.) R.Br.	mil (Fr)	leaves	D, T	anemia	NC
<i>Peperomia pellucida</i> (L.) Kunth	fi Aman (F)	leaves	T	infertility	323
<i>Pergularia daemia</i> (Forssk.) Chiov.	abognufu (T)	leaves	E	galactagogue, pregnancy	283, 640
<i>Periploca calophylla</i> (Baill.) Robery	honman (F)	leaves	T	pregnancy	NC
<i>Persea americana</i> Mill.	avocaman (F, G)	leaves	T, D	anemia, HBP, malaria, pregnancy	NC
<i>Phaulopsis ciliata</i> (Willd.) Hepper	chouchougrouhou (F)	plant		protection against spirits	200
<i>Phyllanthus amarus</i> Schumach. & Thonn.	hlinwé (F, G)	plant, leaves	E, T, VW	HBP, intestinal cleanse, menstruation, postpartum cleanse, pregnancy	239, 344, 642
<i>Phyllanthus muellerianus</i> (Kuntze) Exell	agemukogou (T)	root	T	anemia	296
<i>Phymatosorus scolopendria</i> (Burm. f.) Pic. Serm.	dégoma (F, G, N)	leaves	VW, T	STIs, pregnancy	120, 377
<i>Physalis cf. angulata</i> L.	korogba (N)	plant	T, VW	STIs, vaginal cleanse	NC
<i>Piper guineense</i> Schumach. & Thonn.	piment du guinea (Fr)	fruit, leaves	E, T	contraception, CBD loudjo, pregnancy	NC
<i>Platostoma africanum</i> P.Beauv.	koumobaokuta (T)	leaves	E	pregnancy	648
<i>Polygala arenaria</i> Willd.	mli (F)	plant		infection	205
<i>Portulaca oleracea</i> L.	denkama (F)	plant	EA	pregnancy	110
<i>Prosopis africana</i> (Guill. & Perr.) Taub.	kakema (F)	plant	T, HB, VW	postpartum infections	NC
<i>Psidium guajana</i> L.	guave (Fr)	fruit	E	pregnancy	NC
<i>Pterocarpus erinaceus</i> Poir.	kosso (G, S), ewekpekepe (N)	bark, leaves	T	anemia, cysts, fibroids, menstruation	379
<i>Pterocarpus santalinoides</i> DC.	gbétin (F)	leaves	T	infertility, stomachache	NC
<i>Pycnanthus angolensis</i> (Welw.) Warb.	yayado (F)	root	T	anemia	NC
<i>Raphia</i> sp.	dema (F, M)	wood, leaves	T	placenta removal	NC
<i>Rauwolfia vomitoria</i> Afzel.	vonmausin (G)	leaves	T	pregnancy	374
<i>Rhaphiostylis beninensis</i> (Hook.f. ex Planch.) Planch. ex Benth.	kplakplakando (F)	wood, leaves, root	T, D	intestinal cleanse, menstruation, postpartum cleanse	129 500
<i>Ricinus communis</i> L.	tondedji (F)	leaves	D	abortion, intestinal cleanse, menstruation	NC
<i>Rourea coccinea</i> (Schumach. & Thonn.) Benth.	vikplomba (F, G, S)	leaves	T, E	anemia, infertility	167
<i>Sabicea cabycina</i> Benth.	aviama (F, S)	plant, leaves	VW	STIs, pregnancy	391
<i>Saccharum officinarum</i> L.	canne asucre (Fr)	stem	T	anemia	NC
<i>Sansevieria</i> sp.	kpoyando (G)	root	T	infertility	NC

Botanical Name	Local Name ^e	Used part	Preparation ^b	Use category	AMT ^{#d}
<i>Sarcocephalus latifolius</i> (Sm.) E.A.Bruce	kodo (F, G), umbesi (T)	root	T, M, D	abortion, anemia, childbirth, cysts, fibroids, galactagogue, infertility, intestinal cleanse, menstruation, postpartum cleanse, postpartum infections, pregnancy, stomachache	295
<i>Schwenkia americana</i> L.	zron (F)	plant	D, T	childbirth, pregnancy	324, 352
<i>Secamone afzelii</i> (Roem. & Schult.) K.Schum.	zoucoutou (F), anonsiman (F)	plant, leaves	E, T	anemia, galactagogue, infertility, postpartum infections, pregnancy	322, 349, 639, 597
<i>Securidaca longipedunculata</i> Fresen.	abiwèrè (F, G, N)	leaves	T, D, VW	childbirth, infertility, menstruation, postpartum cleanse, pregnancy, vaginal cleanse	318, 336
<i>Senna alata</i> (L.) Roxb.	amasou (F)	leaves, flower	T, A	cysts, fibroids, intestinal cleanse, menstruation	343, 502
<i>Senna italica</i> Mill.	agwègbé (F)	leaves	D, T	constipation, intestinal cleanse	307
<i>Senna obtusifolia</i> (L.) H.S.Irwin & Barneby	kpanwoun (S)	leaves	T	anemia	NC
<i>Senna occidentalis</i> (L.) Link	agonlika (F), ajambulu (T)	leaves	EN	intestinal cleanse	241
<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby	cassia (F, M)	leaves	T, HB	abortion, childbirth, postpartum cleanse, CBD	165
<i>Secamum indicum</i> L.	sesame (Fr)	plant, seeds	E, A	menstruation, postpartum infections, pregnancy	NC
<i>Sida acuta</i> Burm.f	agbègbema (F), etchokotou (G, N)	leaves, root, whole plant	D, E, T, VW	contraception, intestinal cleanse, menstruation, postpartum cleanse, pregnancy	509, 534, 611
<i>Sida cf. cordifolia</i> L.	agbidi (F)	leaves	T	postpartum hemorrhage	NC
<i>Smilax anceps</i> Willd.	agbaliklaklan (F)	root		cysts, fibroids, menstruation	186
<i>Solanum aethiopicum</i> L.	gbléman (F)	leaves	EA	STIs, vaginal cleanse	566
<i>Sorghum arundinaceum</i> (Desv.) Stapf	jehooma (M)	leaves	T	STIs	172
<i>Sorghum bicolor</i> (L.) Moench	adako (F), okaono (T)	leaves	T	anemia, menstruation	247
<i>Sorghum</i> sp.	le sorgho (Fr)	seeds	EA	infections	NC
<i>Spathodea campanulata</i> P.Beauv.	adade (G, N, S)	plant, leaves, bark	T, VW	HBp, infertility, menstruation, pregnancy, STIs	363, 390
<i>Spondias mombin</i> L.	akikon (F)	leaves, bark	T, VW	HBp, malaria, menstruation, vaginal cleanse	128, 360, 494, 635
<i>Stachytarpheta cayennensis</i> (Rich.) Vahl	alorrohe (S)	plant	T	menstruation	387
<i>Stenospermum kunthianum</i> Cham.	adjadey (T)	leaves, root	E, CS	pregnancy	643
<i>Strophanthus hispidus</i> DC.	tchakpa (F), inchao (T)	root, leaves	E, T	childbirth, cysts, fibroids, menstruation, pregnancy, stomachache	277, 350, 358
<i>Struchium sparganophorum</i> (L.) Kuntze	acodigoue (S)	plant	T	anemia	385
<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	atinkingbadota (F)	flower buds	T, V, A, VW	anemia, galactagogue, contraception, infertility, intestinal cleanse, menstruation, postpartum infections, STIs	116
<i>Syzygium guineense</i> (Willd.) DC.	milamido (N)	root	VW	vaginal cleanse	NC
<i>Tapinanthus globiferus</i> Tiegh.	hansimilin (F)	leaves	T	anemia	571
<i>Tectona grandis</i> L.f.	reckdo (F)	leaves, root	HB, T	anemia	NC

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category	AMT# ^d
<i>Terminalia glaucescens</i> Planch. ex Benth.	aloroun (F)	root, leaves	T, VW	intestinal cleanse, menstruation, vaginal cleanse	305, 627
<i>Tetrapleura tetraptera</i> (Schum. & Thonn.) Taub.	lindja (F)	fruit	VW, T	infertility, menstruation, postpartum infections, STIs, vaginal cleanse	304
<i>Tridax procumbens</i> (L.) L.	kpokpo (F, G)	plant	T	anemia, cysts, menstruation	512
unidentified (AMT 271)	indi (T)	root	T	postpartum infections	271
<i>Uvaria chamae</i> P.Beauv.	aylahado (F)	root, leaves	T	anemia, infertility, menstruation, pregnancy	126, 529
<i>Vepri verdoorniana</i> (Exell & Mendonça) Mziray	agbede (S)	leaves	T, VW	anemia, contraception, infertility, menstruation	386
<i>Vernonia amygdalina</i> Delile	amavive (F)	leaves, whole plant	E, HB, T	galactagogue, postpartum infection, pregnancy, vaginal cleanse	491, 645
<i>Vitex doniana</i> Sweet	foman (F)	leaves, root	T, A	hemorrhoids, menstruation	570
<i>Waltheria indica</i> L.	ataşu yonuvvima (F), misomitwey (M), kasa (T)	Plant, leaves, root	D, T	anemia, infertility, intestinal cleanse, menstruation, postpartum hemorrhage	130, 253, 565
<i>Xylopia aethiopica</i> (Dunal) A.Rich.	kpédjrékoun (F)	fruit	T, A, VW	anemia, contraception, infertility, menstruation, postpartum infections, STIs	NC
<i>Zanthoxylum</i> sp.	heja (M)	leaves	T	intestinal cleanse	NC
<i>Zanthoxylum zanthoxyloides</i> (Lam.) Zepern. & Timler	hêdo (F), chanuwele (T)	bark, root, leaves	T, A, E	abortion, anemia, contraception, hemorrhoids-internal, intestinal cleanse, postpartum cleanse, menstruation, pregnancy, postpartum infections, STIs	145, 288, 654
<i>Zapoteca portoricensis</i> (Jacq.) H.M.Hern.	akanmoun (F)	root	T, A	abortion, contraception	NC
<i>Zea mays</i> L.	gbade (F)	flower stigmas (silk), fruit	T, D, E	anemia, galactagogue, cysts, fibroids	NC
<i>Zingiber officinale</i> Roscoe	ata (T)	rhizome	A, T	cysts, fibroids, hemorrhoids- internal	NC

^a Local languages are abbreviated: (F)= Fon; (Fr)= French; (G)= Goun; (M)= Mina; (N)= Nago; (S)= Sero; (T)= Tcha.

^b Preparations are abbreviated: (A)= soaked in alcohol; (CS)= chew and spit; (D)= drink; (E)= eat; (EA)= external application; (EN)= enema; (HB)= herbal bath; (J)= juice; (M)= massage; (P)= powder; (T)= tea; (TC)= touch contact; (V)= vapor; (VW)= vaginal wash; (W)= waistband

^c Use category abbreviations are as follows: CBD= cultural bound disease; HBP = high blood pressure; STIs= sexually transmitted infections.

^d Botanical voucher number and collector initials; NC= not collected.

Appendix 2

Species cited in 41 women's health questionnaires in Gabon: scientific botanical name, name local language(s), used plant part, preparation, use category and collection number

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT ^{#d}
<i>Abelmoschus esculentus</i> (L.) Moench	etatam (F), gombo (Fr), dongodongo(B), mibodo (B)	leaves, fruit	EN, VI, E	childbirth, pregnancy	845
<i>Abutilon mauritianum</i> (Jacq.) Medik.	odongi		D or EN	childbirth	NC
<i>Acalypha paniculata</i> Miq.	okoenkoenkoeen (F)	leaves	VI	childbirth, pregnancy	844
<i>Acanthos montanus</i> (Nees) T.Anderson	nvovo (F), pachango (M)	leaves	EN, D, E, T	childbirth, galactagogue, menstruation	1367, 1317
<i>Aframomum citratum</i> (C.Pereira) K.Schum.	azum (F)	leaves, root	EN	menstruation, stomachache before delivery	NC
<i>Aframomum giganteum</i> (Oliv. & D.Hanb.) K.Schum.	obadzom (F)	fruit	SIB	pregnancy	NC
<i>Aframomum</i> sp.	piment indigene (Fr), ontoonou (Ob)	fruit, leaves, stem	S, VI, EN, EA, D	hemorrhoids, pregnancy, stomachache, vaginal cleanse	1152
<i>Afrotyrux</i> cf. sp.	mujumbu	bark	EN, D	infertility, postpartum infections	NC
<i>Ageratum conyzoides</i> (L.) L.	etombijoro (Om), hediki (M)	plant, leaves	VI, D	menstruation, vaginal cleanse	1318
<i>Allisia</i> sp.	evovule sak (F)	leaves, plant	VI, EN	cyst, stomachache, vaginal cleanse	876, 1228
<i>Alchornea cordifolia</i> (Schumach. & Thonn.) Müll.Arg.	bonjay (B, M), nkabi (F), mabonja (S), mabunzi (Ok), mobonzibonzi (Os)	leaves, plant	D, T, VW, VI	anemia, HBP, malaria, STIs, vaginal cleanse	827, 838, 870, 1180, 1186, 1295, 1408
<i>Allium cepa</i> L.	oignon (Fr)	stem	T	HBP	NC
<i>Allium sativum</i> L.	ail (Fr)	stem	T	HBP	NC
<i>Alstonia</i> cf. <i>boonei</i> De Wild.	ekoek (F)	bark	D	vermifuge	855
<i>Alstonia congenis</i> Engl.	makouka (B), okouka (M)	bark	T, D	bodyache, galactagogue, menstruation, stomachache	846, 1190
<i>Amaranthus cruentus</i> L.	folon (F)	leaves, plant	EN, E	childbirth, contraception	1240
<i>Amaryllidaceae</i> sp.	molongu (F)	tuber	EN	pregnancy	869
<i>Annickia affinis</i> (Exell) Versteegh & Sosef	nfo (F)	bark	D, T, VW, VI	anemia, childbirth, HBP, pregnancy, STIs	NC
<i>Annona</i> cf. <i>senegalensis</i> Pers.		root	D	HBP	NC
<i>Annona muricata</i> L.	corossolier (Fr)	leaves, bark	T, EN	HBP, pregnancy	871
<i>Anonidium mannii</i> (Oliv.) Engl. & Diels	ebom (F)	bark	EN	protect fetus, pregnancy	NC
<i>Anthocheista</i> cf. sp.	ayindo (F)	bark	T	HBP	765
<i>Anthocheista vogelii</i> Planch.	mondouando (B, M)	bark, leaves	D, E	general good health, HBP, menstruation, STIs	1258

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category	AMT [#]
<i>Antrocarpon klaineanum</i> Pierre	angokon (F)	bark	T, EN, VW	anemia, galactagogue, infertility, placenta removal, postpartum cleanse, postpartum infections, pregnancy, STIs, vaginal cleanse	767, 1204
<i>Aoranthie cladantha</i> (K.Schum.) Somers	tchege (B, M), ibanzao (M)	bark	T, D	galactagogue, infertility, menstruation	896, 1230, 1300
<i>Asparagus warneckei</i> (Engl.) Hutch.		leaves, plant	E, EN	vaginal cleanse, menstruation	1230
<i>Asplenium cf. africanum</i> Desv.	ayan (F)	plant	SIB	pregnancy	NC
<i>Aucoumea klaineana</i> Pierre	nkomma (F)			disinfectant	823
<i>Baillonella toxisperma</i> Pierre	moabi (F), adzap (F)	bark	D, EN, VW	infertility, menstruation, placenta, postpartum cleanse, postpartum infections, vaginal cleanse, vermifuge	NC
<i>Bambusa vulgaris</i> Schrad	bambou de chine (Fr)	leaves, stem	D, T	HBP	984
<i>Brilliantaisia ouariensis</i> PBeauv.	alembetorro (M)	leaves	VI	vaginal cleanse	NC
<i>Cadonoba cf. veltuischii</i> (Oliv.) Gilg	miamongon (F)	bark	VI	vaginal cleanse	NC
<i>Canna indica</i> L.	ekonzok (F)	leaves	HB	headache	1233
<i>Capsicum annuum</i> L	petite piment (Fr)	fruit, seeds	EN, T, VW	backache, childbirth, galactagogue, hemorrhoids, postpartum cleanse, postpartum infections, stomachache, vaginal cleanse	NC
<i>Carapa procera</i> DC.	pongabonga (M)	bark	D	contraception	NC
<i>Carica papaya</i> L.	papaya (Fr)	fruit, leaves, root	E, EN, T	galactagogue, contraception, HBP, STIs	NC
<i>Carpobrotia alba</i> G.Don	onoing (F)	root, leaves	D, E	childbirth, HBP	NC
<i>Cecropia cf. peltata</i> L.	parasolier (Fr)	root	D	infertility	NC
<i>Ceiba pentandra</i> (L.) Gaertn.	baobab (Fr)	bark	D	anemia	882
<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	langalanga (Ob)	leaves	EA	sores	1178
<i>Cissus amlioides</i> (Welw. ex Baker) Planch.	agondjie (F)	leaves	EN	menstruation	867
<i>Cissus cf. oreophila</i> Gilg & M.Brandt		cord, plant, leaves	T	pregnancy, menstruation	1296
<i>Citrus aurantiifolia</i> (Christm.) Swingle	citron (Fr)	fruit	D, T	HBP; malaria, postpartum hemorrhage, pregnancy	NC
<i>Cleistanthus cf. glauca</i> Pierre ex Engl. & Diels	nohoney (Ok)	cord	W	pregnancy	NC
<i>Cleistanthus cf. patens</i> (Benth.) Engl. & Diels	ohoey (B)	cord	W	pregnancy	1279
<i>Clerodendrum formicarum</i> Gürke		plant	EN	pregnancy	1236
<i>Coelocaryon preussii</i> Warb.		bark	T	anemia	1305
<i>Cola nitida</i> (Vent.) Schott & Endl.	ngwan (F)	seeds, bark	EN	GBD les urines, childbirth	NC
<i>Cola</i> sp.	kola (F)	seed, bark	D, VW, E	childbirth	NC
<i>Combretum aphanopetalum</i> Engl. & Diels	otoclefok (F)	leaves	VI	vaginal cleanse	866
<i>Combretum racemosum</i> PBeauv.	mosombasomba (Ok)	leaves	VI	vaginal cleanse	NC

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT# ^d
<i>Commelina cf. diffusa</i> Burm.f.	essang (F)	leaves	VI	vaginal cleanse	1362
<i>Costus afer</i> Ker Gawl.		flower	T	STIs	NC
<i>Costus</i> sp.	myen (F)	plant, leaves	HB, D, EN	anemia, fibroids, cysts, galactagogue, pregnancy, menstruation, postpartum hemorrhage, vaginal cleanse, vermifuge	NC
<i>Cucumeropsis mannii</i> Naudin	inzaka (B, M), concombre traditionnel (Fr)	fruit, seeds	D, E	childbirth, infertility	854
<i>Cyathula prostrata</i> (L.) Blume	dizazuru (Ok), chabanakoko (B)	flower, plant		HBP, vaginal cleanse	1294, 1400
<i>Cylicodiscus gabonensis</i> Harms	edum (F)	bark	D, HB, T	anemia, pregnancy, vermifuge	NC
<i>Cymbopogon citratus</i> (DC.) Stapf	tisane (Fr)	leaves	T	HBP	NC
<i>Cymbopogon</i> sp.	citronelle (Fr)	leaves, root, stem	SB, D, T	HBP, STIs, pregnancy	NC
<i>Dacryodes cf. edulis</i> (G.Don) H.J.Lam	osigi (Ob)	leaves	VI	vaginal cleanse	1181
<i>Daniellia kladinei</i> A.Chev.	oengy (B)	bark	T	contraception	1268
<i>Desmodium adscendens</i> (Sw.) DC.	obumen zeny (F)	leaves	E	infertility	NC
<i>Diosphora spenneroides</i> Benth.	massessi (B)	leaves	VI	vaginal cleanse	1194
<i>Dioscorea bulbifera</i> L.	ebouba (M)	fruit	EA	abscesses	1312
<i>Dioscoreophyllum volkensii</i> Engl.	tziga (F)	plant	D	postpartum hemorrhage	1249
<i>Drypetes</i> sp.	esop (F)	inside bark	VI	vaginal cleanse	878
<i>Elaeis guineensis</i> Jacq.	essong (F)	heart, oil, leaves	E, D	contraception, galactagogue, infertility, placenta removal	NC
<i>Emilia coccinea</i> (Sims) G.Don	alonvoo (F)	leaves	D	menstruation	825
<i>Ethulia cf. conyzoides</i> L.f.		leaves	VI	postpartum infections	NC
<i>Euphorbia hirta</i> L.	derebelli (Os)	plant	E	childbirth	1411
<i>Ficus cf. thoringii</i> Blume	atak (F)	bark	D, EN, HB	galactagogue, infertility, pregnancy	NC
<i>Ficus exasperata</i> Vahl	ako (F)	bark	D	childbirth, pregnancy	848
<i>Ficus mucosa</i> Walw. ex Ficalho	ekoko (F)	leaves, bark	D, T	anemia, backache	826
<i>Flagellaria cf. guineensis</i> Schumacher.	enganisang (F)	leaves	EN	postpartum hemorrhage	NC
<i>Fleroya ledermannii</i> (K. Krause) Y.F.Deng	tobu (M), epoukou (M)	bark	D	contraception, infertility, menstruation, pregnancy	897
<i>Funtumia africana</i> (Benth.) Stapf	oranda (B)	bark	D, T	galactagogue	1287
<i>Gnetum africanum</i> Walw.	nkoumou (Ob)	leaves	E	pregnancy	824
<i>Gossypium barbadense</i> L.	coton (Fr)	leaves	T, D	HBP, postpartum hemorrhage	NC
<i>Gouania longipetala</i> Hemsli.	musangia (B)	bark	D	vaginal cleanse	1276
<i>Guibourtia tesmannii</i> (Harms) J.Leonard	obaka (B, M), kevasingo (F)	bark	D, T	diabetes, HBP, infertility, postpartum hemorrhage, pregnancy	764
<i>Halopogon azurea</i> (K.Schum.) K.Schum.		leaves	L	pregnancy	NC
<i>Harungana madagascariensis</i> Lam. ex Poit.	atuin (F)	leaves	HB, E, D	HBP, postpartum infections, pregnancy	NC

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT# ^d
<i>Heterotis rotundifolia</i> (Sm.) Jacq.-Fécl.	ekaso (F)	plant	VI	vaginal cleanse	1248
<i>Heterotis</i> sp.	ekaso (F)	plant	VI	STIs	NC
<i>Hibiscus</i> sp.	lesseille (F)	flower, leaves	D, E, VI	anemia, vaginal cleanse, pregnancy	NC
<i>Hymenocandia acida</i> Tul.	ongamana (Ob)	leaves	D	galactagogue	1155
<i>Hymenocandia ulmoides</i> Oliv.	esang (F)	leaves	VI	stomachache, vaginal cleanse	847
<i>Igea edulis</i> Mart.		seeds	VW	fibroids, cysts	NC
<i>Iringia gabonensis</i> (Aubry-Lecomte ex O'Rorke) Baill.	andofan (F), mangué sauvage (Fr)	fruit, bark	D, EN	galactagogue, infertility, menstruation	1356
<i>Justicia secunda</i> Vahl	fleur rouge (Fr)	plant, leaves	T	anemia	805, 986
<i>Keetia</i> sp.	ratta (F)	bark, leaves	D, VI	infertility, menstruation, vaginal cleanse	766
<i>Lagenaria</i> cf. sp.	calabasse (Fr), londuh (F)	fruit	B	placenta removal	NC
<i>Lagera</i> cf. <i>alata</i> (D.Don) Sch.Bip. ex Oliv.	tabac de pygmée (Fr)	leaves	D	fibroids, cysts	NC
<i>Landolphia</i> cf. <i>ovariensis</i> P.Beauv.	pondzie	leaves	D	anemia, galactagogue, contraception	NC
<i>Lantana camara</i> L.		leaves	T	malaria	1188
<i>Laportea</i> cf. <i>aestivans</i> (L.) Chew	terakun (F)	plant	E, VI	childbirth	NC
<i>Laportea</i> cf. <i>ovatifolia</i> (Schumacher & Thonn.) Chew	dipakazangoue (Ok)	leaves		contraception	NC
<i>Leuca guineense</i> G.Don	mbala (Om)	bark	D	childbirth	NC
Leguminosae sp.		bark	T	menstruation	1304
<i>Lippia adoensis</i> Hochst. ex Walp.	mututu	leaves	T	galactagogue	NC
<i>Lippia</i> cf. <i>rugosa</i> A.Chev.	afing (F)	leaves	T	galactagogue	760
<i>Lippia multiflora</i> Moldenke	punya (S), tisane sauvage (Fr)	leaves	T	HBP, galactagogue	1410
<i>Lippia</i> sp.	lewayi (Ob)	leaves	D	menstruation, postpartum cleanse, postpartum hemorrhage	1179
<i>Macaranga spinosa</i> Müll.Arg	asas (F)	leaves	HB, E, SB, VI	pregnancy, menstruation, vaginal cleanse, diarrhea	1192, 1197
<i>Macropsis eminiitii</i> Engl.	enkale (F), mongobe (B)	bark	EN, T	infertility, galactagogue	879
<i>Mangifera indica</i> L.	mangue (Fr)	bark, leaves	VW, T	menstruation, postpartum infections, STIs, stomachache	839
<i>Manihot esculenta</i> Crantz	manioc (Fr)	leaves, tuber	E, EN, D	childbirth, galactagogue, postpartum hemorrhage, pregnancy	NC
<i>Mikania chenopodiifolia</i> Willd.	madamoiselle (Fr)	plant	SIB	pregnancy	1242
<i>Millettia excelsa</i> (Welw.) C.C.Berg	abang (F)	leaves, bark	D	galactagogue	835, 836, 1368
<i>Millettia</i> cf. <i>versicolor</i> Baker	banjanjoko (B)	bark	T	general good health	1306
<i>Momordica charantia</i> L.	mabubulu	leaves	D	contraception	NC
<i>Morinda lucida</i> Benth.	akon (F)	bark	HB, T, EN	HBP, intestinal cleanse, pregnancy	1213

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT ^{#d}
<i>Musa</i> sp.	umbolokon (F)	leaves, fruit, bark	D, E, EN, SB	anemia, backache, childbirth, galactagogue, menstruation, placenta removal, STIs, vaginal cleanse, vermifuge	NC
<i>Musanga cecropioides</i> R.Br. ex Tedlie	mohombo (B)	leaves	D	childbirth	985, 1309
<i>Myrsine arborea</i> P.Beauv.	angokon (F)	bark	D, EN	pregnancy, postpartum cleanse, postpartum infections	853, 1073
<i>Nicotiana tabacum</i> L.	taba (F)	leaves	EN	GBD zchaw, pregnancy	NC
<i>Nymphaea lotus</i> L.	otoctoe (F)	leaves	VI	vaginal cleanse	NC
<i>Ocimum americanum</i> L.	sizey (S)	leaves	T, D	galactagogue, placenta, postpartum cleanse	1407, 1142
<i>Ocimum gratissimum</i> L.	messep (F), masiperzipo (Os)	leaves, plant	D, T, VI	galactagogue, malaria, menstruation, pregnancy, vaginal cleanse, vaginal cleanse	1072, 1409, 1412, 1143
<i>Ocimum</i> sp.	dziandzie (P)	leaves	D	fibroids, cysts	NC
<i>Oryza sativa</i> L.	riz (Fr)	seed	E	galactagogue	NC
<i>Passiflora foetida</i> L.	esjesum (F)	stem, leaves	EN	infertility, vermifuge	849
<i>Pentaclethra macrophylla</i> Benth.	mpandzi (M), ompie (T)	bark, fruit	EN, D, VW, E	pregnancy, stomachache, vaginal cleanse	1077, 1263
<i>Perichasma</i> cf. <i>laetificata</i> Miers	enzigue (F)	root	E	pregnancy	NC
<i>Periploca nigrescens</i> Afzel.	alarminson (F)	leaves	VI	vaginal cleanse	NC
<i>Persca americana</i> Mill.	avocat (Fr)	leaves	T, VI	HBP, vaginal cleanse	982
<i>Petersianthus macrocarpus</i> (P.Beauv.) Liben	abing (F)	bark, leaves	L, SiB, D, S, VI	anemia, backache, pregnancy, vaginal cleanse	1220
<i>Phyllanthus</i> sp.	kanguh (F)	plant	VI	vaginal cleanse	1245
<i>Picralima nitida</i> (Stapf) T.Durand & H.Durand	dumavendo (B, M)	fruit, bark	EN, D	fibroids, cysts, malaria, vermifuge, HBP	1250, 1316
<i>Piper umbellatum</i> L.	abomanzan (F)	plant, leaves	SiB, EN, SB	hemorrhoids, infertility, placenta removal, pregnancy, vaginal cleanse	761
<i>Piptadeniastrum africanum</i> (Hook.f.) Brenan	nlouey (F)	leaves, bark	L, EN	GBD mfoes, infertility	1219
<i>Pistia</i> cf. <i>stratiotes</i> L.	angoun (F)	plant	E	infertility	NC
<i>Plagiocladus diandrus</i> (Pax) Jean F.Brunel	mbango (B)	leaves	E	anemia, HBP	1260
<i>Plagiostyles affricana</i> (Müll.Arg.) Prain	elesula (F)	bark	EN	menstruation, postpartum infections	NC
<i>Plectranthus monostachyus</i> (P.Beauv.) B.J.Pollard	echipo (M)	plant	D	headache	1319
<i>Poga oleosa</i> Pierre	oayko (M)	plant	EA	sores	1314
<i>Portulaca oleracea</i> L.	dikamiya (Ok)	leaves	T	childbirth	1402
<i>Pseudospondias longifolia</i> Engl.	ofoss (F)	bark	D, EN, T	anemia, stomachache	1081
<i>Psidium guajava</i> L.	guave (Fr)	leaves	SB	malaria, vaginal cleanse	NC
<i>Pteridium aquilinum</i> (L.) Kuhn	ebango (B)			childbirth	1274

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT# ^d
<i>Pterocarpus soyauxii</i> Taub.	umbel (F), kaolin rouge (Fr)	bark	D, T, SiB	anemia, galactagogue, infertility, placenta removal, pregnancy, STIs	880, 1203
<i>Pycnanthus angolensis</i> (Welw.) Warb.	mitchoko (B)	bark	T	anemia	NC
<i>Quassia cf. africana</i> (Baill.) Baill.	icindural (P)	root	T	HBP	763
<i>Rauwolfia vomitoria</i> Afzel.	tchwele (Ob)	bark	SiB	menstruation	1161
<i>Saccharum officinarum</i> L.	canne sucre (Fr)	juice, stem, plant	D, EN, T	fibroids, cysts, HBP, menstruation	829
<i>Sanitria cf. trimera</i> (Oliv.) Aubrév.	outou (F)	resin, bark	S	CBD zchaw	NC
<i>Sarcocephalus latifolius</i> (Sm.) E.A.Bruce	ondolo (Ob)	fruit, bark	D, EN	galactagogue, stomachache	1156
<i>Scleria boivinii</i> Steud.	zengey (B)	leaves	D	postpartum hemorrhage, stomachache	1307
<i>Scoparia dulcis</i> L.	nzonzo (F), zedsoro (F)	leaves	D	childbirth	1364
<i>Scyphocephalum cf. ochocoa</i> Warb.	sogo (F)	bark	E	menstruation	NC
<i>Selaginella myosuroides</i> Alston	choyi (M), mahoy (B)	leaves	E	pregnancy, HBP	1063, 1198
<i>Senna alata</i> (L.) Roxb.	kinkiliba (F)	leaves	D, T, S	infertility, STIs	1320
<i>Senna occidentalis</i> (L.) Link	ngari (Ob)	leaves	EA, E	stomachache	1184, 1366
<i>Sida acuta</i> Burm.f.	nzisim (F)	leaves, stem, plant	D, EN, W, SiB, VI	childbirth, CBD on/onyaboom, CBD les urines, pregnancy, postpartum cleanse	828, 1401, 1177, 1406, 1151, 1254, 1237
<i>Solanace angulatus</i> (Vahl) C. Jeffrey	moyambo (B)	leaves	D	childbirth	1298
<i>Solanum americanum</i> Mill.	otchango (M)	leaves	E, D	pregnancy	NC
<i>Solanum anguivi</i> Lam.	petit aubergine (Fr), omboronu (Ob)	fruit	D, T	galactagogue, menstruation, postpartum cleanse, postpartum hemorrhage	NC
<i>Solanum lycopersicum</i> Lam.	tomate (Fr)	fruit	D	anemia	NC
<i>Strychnos cf. sp.</i>		bark	SiB	vaginal cleanse	NC
<i>Tabernaemthe iboga</i> Baill.	bois sacre (Fr)	root	E	anemia, contraception, HBP	NC
<i>Tetracera alnifolia</i> Willd.	movova/lian-aho (B)		D	STIs	1259
<i>Tetrapleura tetraptera</i> (Schum. & Thonn.) Taub.	tsélé (M)	fruit	T, EN	galactagogue, menstruation, pregnancy	NC
<i>Tetrorchidium didymostemon</i> (Baill.) Pax & K.Hoffm.	zili (F)	bark	D, EN	galactagogue, infertility, menstruation, postpartum infections	875
<i>Theobroma cacao</i> L.	cacaowey (F)	bark, fruit, leaves	D, T	anemia, HBP, postpartum cleanse	872, 1205
<i>Tibhonia diversifolia</i> (Hemsl.) A. Gray	magariet (F)	leaves	D	HBP	NC
<i>Treclia cf. acuminata</i> Baill.	mpovo (B)	bark	D	fetus strengthener	1262
<i>Treclia erinacea</i> A.Chev.	edzip (F)	bark	T, EN	anemia, infertility	NC
<i>Trichoscypha cf. bijuga</i> Engl.	lokouta (B)	leaves	E	HBP	1299
<i>Trichoscypha</i> sp.	aboet (F)	bark	VW	postpartum cleanse	NC
<i>Tristemma cf. hirtum</i> P. Beauv.	masessa	leaves	VI	vaginal cleanse	NC
<i>Tristemma littorale</i> Benth.	abillebong (F)	leaves	VI	vaginal cleanse	861, 0873
<i>Tristemma mauritanium</i> J.F. Gmel.		leaves	T	stomachache	1084

Botanical Name	Local Name ^a	Used part	Preparation ^b	Use category ^c	AMT# ^d
unidentified (AMT 1277)	moutey (B)	bark	D	contraception	1277
<i>Urena lobata</i> L.	okon (F)	leaves	D	postpartum hemorrhage	1238
<i>Vernonia amygdalina</i> Delile		leaves		stomachache	1189
<i>Xylopia aethiopica</i> (Dunal) A.Rich.	ohia (M)	leaves	E	HBP	1321

^a Local languages are abbreviated: (B)= Babungu; (F)= Fang;(Fr)= French; (M)= Mirsogo; (Ob)= Obamba; (Obk)= Okande; (Om)= Omiene; (Os)= Osimba; (S)= Sake; (T)= Teke.

^b Preparations are abbreviated: (B)= blow into it; (D)= drink; (E)= eat; (EA)= external application, (EN) = enema; (HB)= herbal bath; (L)= lay upon; (S)= scarification; (SB)= steam bath; (SiB)= sit bath; (T)= tea; (VW)= vaginal wash; (W)= waistband.

^c Use category abbreviations are as follows: CBD= cultural bound disease; HBP = high blood pressure; STIs= sexually transmitted infections.

^d Botanical voucher number and collector initials; NC= not collected.

