Chapter Three

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

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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; Ruysschaert 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 (% informants[1])	# of citations (% 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%)

[1]percentage 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 248 species)	# of 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 patient's 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 a "loudjo" (Fon) was cited as a common case for infertility in which a women'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 cites 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.

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Appendix 1

Species cited in 46 wome'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]
Abrus precatorius L.	degbeybegbey (F), yekpeyekpeman (F), viviman (N)	root, leaves	T	contraception, infertility, pregnancy	NC
Acacia nilotica (L.) Delile	bonni (F)	seeds	T	menstruation	338
Acanthospermum hispidum DC.	togbama (M), kpononmi (N)	plant, leaves	T	HBP, infertility, pregnancy	376, 381, 535
Acmella caulirhiza Delile	awlekpekpe (S)	plant	T	postpartum hemorrhage	397
Acridocarpus smeathmannii (DC.) Guill. & Perr.	gbanguinan (F)	root, bark	T	anemia	300, 355, 599
Acrostichum aureum L.	Sofoco (S)	leaves	T	pregnancy	NC
Aframomum melegueta K.Schum.	atakoun (F)	fruit	T	childbirth, galactagogue, menstruation, STIs	309
Afzelia africana Pers.	aguakpogoto (F)	bark	VW	STIs	362
Aganope stuhlmannii (Taub.) Adema	siensiendo (F)	root, bark	T	infertility, menstruation	NC
Agelaea pentagyna (Lam.) Baill.	ahouanhlazou (S)	leaves	T	pregnancy	383
Albizia adianthifolia (Schum.) W.Wight	awagotingoto (F)	bark	T	menstruation	369
Allium cepa L.	petite onion (Fr)	stem	V, T, VW, A	galactagogue, HBP, infertility, menstruation, postpartum infections	117
Allium sativum L.	aiyo (G)	stem	T, D	childbirth, cysts, fibroids, HBP, menstruation	NC
Aloe macrocarpa Tod.	aloes (M)	leaves	J	anemia	487
Ampelocissus leonensis (Hook.f.) Planch.	tekple (N)	plant	T	infertility, pregnancy	320
Anacardium occidentale L.	cadjou (F)	bark, leaves, root	T, VW, HB	HBP, infertility, STIs, postpartum infections, pregnancy	331
Ananas comosus (L.) Merr.	ananas (Fr)	fruit	T	anemia	NC
Anchomanes cf. *difformis* (Blume) Engl.	agohouéhè do (F)	root	T	infertility	315
Annickia polycarpa (DC.) Setten & Maas	atahé (F)	bark	T	menstruation	NC
Annona muricata L.	shapshap (F)	leaves	T	HBP, STIs	NC
Annona senegalensis Pers.	nyuglo (F), bejunongley (M), tineybobo (T)	leaves, root	E, P, T	childbirth, STIs, pregnancy	602, 644
Anthocleista sp.	clabalabagoto (F)	bark	T	intestinal cleanse	523
Anthocleista vogelii Planch.	gotoundo (F)	root, leaves, wood	T	infertility, intestinal cleanse, stomachache	348
Arachis hypogaea L.	arachide (Fr)	seeds	E	galactagogue, pregnancy	NC
Argemone mexicana L.	wetcheyon (G)	leaves	T, VW	pregnancy, STIs, vaginal cleanse	NC

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Artocarpus cf. *altilis* (Parkinson ex F.A.Zorn) Fosberg	blèfutu asu (M)	leaves	T	HBP	NC
Asteraceae sp.	atentebe (T)	plant	T	stomach ache	292
Azadirachta indica A.Juss.	kini (F)	leaves	T	abortion, pregnancy, stomachache	NC
Baphia nitida Lodd.	sokpèkpè (F)	wood	T, A	contraception, cysts, fibroids, intestinal cleanse, menstruation, postpartum cleanse	319
Barteria cf. *nigritana* Hook.f.	oko goto (F)	bark		anemia	NC
Bauhinia thonningii Schum.	kloman (F), banmo (T)	leaves	E, T	pregnancy, HBP	647
Beta vulgaris L.	la betterave (Fr)	root	E	anemia	NC
Blighia cf. *unijugata* Baker	agboviawondo (N)	bark	T	intestinal cleanse	NC
Boerhavia erecta L.	tikpatikpalala (T)	leaves	E	pregnancy	298
Bridelia ferruginea Benth.	houssoukokoé (F)	root, leaves, bark	T, A, VW	anemia, contraception, infertility, menstruation, postpartum infections, STIs, vaginal cleanse	NC
Bryophyllum pinnatum (Lam.) Oken	afitiman (S)	leaves	T	postpartum cleanse	NC
Burkea africana Hook.	atapa (T)	leaves	E	pregnancy	646
Caesalpinia bonduc (L.) Roxb.	adjikuiman (F)	seeds, leaves, root	D, E,T, W	childbirth, diuretic, infertility, menstruation, postpartum bleeding, postpartum cleanse, postpartum infections, pregnancy, STIs, vaginal cleanse	484, 651
Caesalpinia pulcherrima (L.) Sw.	orgueil de chine (Fr)	fruit (young), leaves, bark	T, P	HBP, infections	480
Cajanus cajan (L.) Millsp.	eweotini (N)	leaves	T	menstruation	NC
Caladium bicolor (Aiton) Vent.	wèkènoukoun (F)	plant	TC	menopause cause	568
Calotropis gigantea (L.) Dryand.	kpinto (F)	leaves	T	cough	NC
Canna cf. *indica* L.	sidakin (G)	plant	T	STIs	NC
Capsicum annuum L.	pimment (Fr)	fruit	T, P, EN, A	cysts, fibroids, hemorrhoids- internal, HBP, intestinal cleanse	256
Carica papaya L.	kpinman (F,G)	leaves, fruit, root	T, D	anemia, galactagogue, infertility, contraception, cysts, fibroids, HBP, pregnancy, menstruation, vaginal cleanse	NC
Carissa spinarum L.	ahouanzodo (F)	root	T, VW, A	anemia, cysts, fibroids, menstruation, postpartum infections, STIs	332, 373, 504, 524
Cassytha filiformis L.	agbégbékan (F)	plant	T, VW	pregnancy, vaginal cleanse, infertility	326
Ceiba pentandra (L.) Gaertn.	kpatindèhoun (F), batidenia (M)	leaves	D	childbirth	567
Celosia cf. *argentea* L.	soman (G)	leaves	T	anemia	NC
Celtis cf. *zenkeri* Engl.	agbohingla (S)	bark	T	cysts, fibroids	NC
Ceratotheca sesamoides Endl.	komokuile (T), agboma (F)	leaves, whole plant	D, E, T	anemia, childbirth, pregnancy	655

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Chamaecrista mimosoides (L.) Greene	kilafimitche (S)	plant	VW	STIs	389
Chamaecrista rotundifolia (Pers.) Greene	azima (F, G)	leaves, whole plant	VW, T	infertility, pregnancy, STIs	NC
Chassalia kolly (Schumach.) Hepper	djêtindo (F)	root	T	childbirth, intestinal cleanse, cysts, fibroids, menstruation	187, 328
Chromolaena odorata (L.) R.M.King & H.Rob.	agatou (F, G, N)	leaves	T, VW	vaginal cleanse	NC
Chrysophyllum albidum G.Don	azongogoegoto (G)	bark	T	galactagogue	NC
Chrysopogon sp.	tékanwannon (F)	plant	T	menstruation	339
Cissampelos mucronata A.Rich	djokodje (K)	leaves	T	postpartum hemorrhage	515
Cissampelos mucronata A.Rich.	djokodjè (F, G)	leaves, whole plant	T	infertility, CBD loudjo, infertility, menstruation, pregnancy	314
Cissampelos owariensis P.Beauv. ex DC.	tjokodje (F)	leaves	D	infertility, pregnancy	NC
Cissus populnea Guill. & Perr.	dedo (F)	root	D	childbirth	122
Citrullus colocynthis (L.) Schrad.	tchègba (F), kaka (T)	leaves, seeds, fruit	E, T	STIs, intestinal cleanse, pregnancy	238, 303
Citrullus lanatus (Thunb.) Matsum. & Nakai	wanyiwanyikoun (F)	fruit	T	intestinal cleanse	505
Citrus aurantiifolia (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
Citrus sp.	klèman (F)	leaves, root, fruit	T	HBP, menstruation, pregnancy, intestinal cleanse, menstruation, stomachache	347
Clausena anisata (Willd.) Hook.f. ex Benth.	gbozohoun (F)	leaves, bark, root	VW, T	menstruation, postpartum infections, STIs	330, 576
Cleistopholis patens (Benth.) Engl. & Diels	hounsoué do (F, G, N)	bark, leaves, root	T	infertility, intestinal cleanse, pregnancy	375
Cleome viscosa L.	agatouma (F)	plant	VW	STIs	NC
Cnestis ferruginea Vahl ex DC.	akpaflo (F)	seeds, root	T	menstruation, anemia	340
Cochlospermum planchonii Hook.f. ex Planch.	betou (T)	leaves	E	pregnancy	656
Cocos nucifera L.	agodo (F, G, N)	fruit, root, seeds, fruit water	D, T	anemia, galactagogue, cysts, fibroids, HBP, yellow fever, menstruation	370, 378
Combretum cf. *grandiflorum* G.Don	adounsitoman (G, S)	leaves	D, T	childbirth, infertility	NC
Commelina erecta L.	tchankoko (F)	rhizome	T	menstruation	334
Corchorus olitorius L.	krenkren (F)	leaves, root	E, T	food, menstruation	166
Costus lucanusianus J.Braun & K.Schum.	tetregoudou (G)	plant	T	cysts, fibroids	372
Costus sp.	tetregouman (S)	leaves	T	intestinal cleanse, vaginal cleanse	NC
Crateva adansonii DC.	hontonzonzouin (F)	leaves	T, VW	HBP, menstruation, STIs, vaginal cleanse	NC
Crescentia cujete L.	kamma (F)	leaves	D	intestinal cleanse	NC
Croton gratissimus Burch.	jelele (F)	leaves, bark, root	T, P	CBD loudjo, childbirth, HBP, menstruation, pregnancy	327
Cucumeropsis cf. *mannii* Naudin	goussitchègba (F, G)	seeds	T	infertility, intestinal cleanse, menstruation	NC
Curculigo pilosa (Schumach. & Thonn.) Engl.	ayote (F)	tuber	V, D, T	galactagogue, intestinal cleanse, menstruation	118, 333

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Curcuma sp.	chyiaoumkoko (F)	rhizome		infections	196
Cyanthillium cinereum (L.) H.Rob.	hunsikusey (F)	plant, leaves	T	CBD loudjo, contraception, pregnancy,	540, 595
Cymbopogon citratus (DC.) Stapf	teeman (F, N)	leaves	T	anemia, childbirth, galactagogue, pregnancy, stomachache	NC
Cynometra megalophylla Harms	bougoto (F, N, G)	bark	T	anemia	NC
Daniellia oliveri (Rolfe) Hutch. & Dalziel	nyado (F), inya (T)	leaves, bark, wood	E, D, HB, P	pregnancy, galactagogue, infertility	584, 652
Desmodium gangeticum (L.) DC.	zèdali (F, N, G)	leaves, whole plant	T, D	childbirth, infertility, pregnancy	316
Desmodium velutinum (Willd.) DC.	bandowo (F, N, G)	leaves, whole plant, fruit	T, VW	CBD loudjo, HBP, menstruation, pregnancy	250, 508
Dialium guineense Willd.	loma (M)	leaves	D, E	galactagogue, intestinal cleanse, vegetable	481
Dichapetalum madagascariense Poir.	gbago (F)	leaves	T	cysts, fibroids, HBP, pregnancy, menstruation	142, 169
Diodella sarmentosa (Sw.) Bacigalupo & Cabral ex Borhidi	sèhwi (F, G)	plant, leaves	T	infertility, menstruation, pregnancy	317, 528
Dioscorea sp.	gando (F)	root, fruit	T	cysts, fibroids, menstruation, anemia	357
Dysphania ambrosioides (L.) Mosyakin & Clemants	godo (F), amantrouzou (F)	plant, leaves	EA, VW, T	menstruation, postpartum infections, STIs, vaginal cleanse	479, 519
Ehretia cymosa Thonn.	mionman (F), bodomey (T)	leaves	E, T	menstruation, pregnancy, HBP	380, 657
Elaeis guineensis Jacq.	l`huile rouge (Fr)	seeds, oil from seeds, infructescence, leaves	E, EA, HB, T	galactagogue, internal hemorrhoids, HBP, muscle pain, fatigue, pregnancy	578
Eleusine indica (L.) Gaertn.	akpi (K)	leaves	D	childbirth	513
Entada africana Guill. & Perr.	kpakpassoumehaman (S)	leaves	T	contraception	394
Entada gigas (L.) Fawc. & Rendle	gbagbara (F)	seeds, bark	T	infertility, pregnancy	NC
Erythrina senegalensis DC.	pbaklesido (F)	bark, root	T	anemia, contraception, infertility, menstruation pregnancy	131, 527
Fabaceae sp.	fonvi (S)	plant	T	menstruation	NC
Ficus sur Forssk.	agpoto (T)	root, leaves	T	anemia, pregnancy	293, 388, 510, 653
Flacourtia indica (Burm. f.) Merr.	gbohouncadjè (F)	root, leaves	T, D	anemia, pregnancy	127, 356
Flacourtia sp.	gbougbadjo (G)	wood	T	intestinal cleanse	371
Flueggea virosa (Roxb. ex Willd.) Royle	tcheke-tcheke (F)	leaves	T	fever, intestinal cleanse, malaria, pregnancy	193
Fulvifomes cf. *fastuosus* (Lév.) Bondartseva & S. Herrera	chutin (F)	fungus	T	infertility	123
Ganoderma sp.	djouatin (F)	fungus	T	pregnancy	NC
Garcinia kola Heckel	ahowo (G)	wood	T	menstruation	368
Garcinia sp.	kola (F)	bark, seeds	T, E	anemia	NC
Gardenia ternifolia Schumach. & Thonn.	adakpla (F)	plant, root, leaves	T	HBP, malaria, pregnancy	301, 510, 521, 564
Gladiolus dalenii Van Geel	baka (F)	stem	T	menstruation	335

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Gmelina arborea Roxb.	fofitin (F)	leaves	T	HBP	359
Gomphrena celosioides Mart.	papatajè (K)	plant	T	HBP	516
Gossypium barbadense L.	tchekey	plant			612
Gossypium hirsutum L.	avokanfochekey (F)	leaves	D, T	anemia	NC
Grewia cf. *carpinifolia* Juss.	oriman (G)	leaves	T	pregnancy	NC
Gymnosporia senegalensis (Lam.) Loes.	yedoman (F)	leaves, bark	T	cysts, fibroids	NC
Helianthus sp.	botiowo (T)	leaves	EN	intestinal cleanse	278
Heliotropium indicum L.	koklusu danpaja (M)	plant, leaves	D, T	childbirth, HBP	522
Heterotis rotundifolia (Sm.) Jacq.-Fél.	hêhêman (F)	leaves, bark	T, D, VW	anemia, childbirth, cysts, fibroids, HBP, infertility, menstruation, pregnancy, protection against sorcery, postpartum infections, STIs	NC
Hibiscus acetosella Welw. ex Hiern	podey (M)	leaves	T	anemia	151
Hibiscus sabdariffa L.	bissap (Fr)	leaves	T	cysts, fibroids, pregnancy	485
Hibiscus surattensis L.	kpofin (F, G, N)	plant, leaves	T	anemia, infertility, pregnancy	150, 310, 503
Hymenocardia acida Tul.	fefeya (T), orukpa (T)	leaves	E	pregnancy	641, 649
Hyptis suaveolens (L.) Poit.	kulubi (T)	leaves, root	E, T	galactagogue, STIs, pregnancy, stomachache	275, 536
Imperata cylindrica (L.) Raeusch.	cekunu (F), eweekan (N)	leaves	VW	pregnancy, vaginal cleanse	NC
Indigofera hirsuta L.	zogbeyzi (M)	leaves	T	pregnancy	170
Indigofera pulchra Willd.	azima (F)	plant	T	pregnancy	614
Ipomoea aquatic Forssk.	ahinandje (S)	plant	T	postpartum hemorrhage	399
Ipomoea batatas (L.) Poir.	patat douce (Fr)	leaves	T	contraception	NC
Irvingia gabonensis (Aubry-Lecomte ex O'Rorke) Baill.	bègbègma (M), asroma (M)	leaves	T	diarrhea, dysentery, hemorrhoids	482
Jatropha curcas L.	yinkpotin (N), eweakporo (N)	leaves	T, HB, VW	anemia, HBP, malaria, menstruation, stomachache	263, 483
Jatropha gossypiifolia L.	yokpotinmannovo (N)	root	T	anemia	353, 572
Justicia flava (Vahl) Vahl	tchoutchougboutchou (F, S)	leaves, whole plant	T	anemia, menstruation	393
Khaya senegalensis (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
Kigelia africana (Lam.) Benth.	gnanblikpo (F)	leaves, bark, fruit	EA, T	breast inflammation, cysts, fibroids, infertility, intestinal cleanse, menstruation, stomachache	249, 342, 396
Lannea acida A.Rich.	akou (T)	bark	T	anemia	282
Lannea barteri (Oliv.) Engl.	houmansitékannon (F)	bark, leaves	T	anemia, menstruation	351
Lantana camara L.	hlatchayo (F)	leaves, whole plant	T, VW	postpartum infections, STIs, vaginal cleanse	NC
Laportea aestuans (L.) Chew	kesukesu (F)	plant	T	menstruation	111
Lippia multiflora Moldenke	yinya (F)	leaves	T, VW	cysts, fibroids, STIs, vaginal cleanse	311

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Lippia sp.	aglala (F)	leaves	T, VW	HBP, menstruation, postpartum infections, STIs, vaginal cleanse	NC
Lycopodiella cernua (L.) Pic. Serm.	hingble (F, S)	plant	P, T	childbirth, pregnancy	132
Mallotus oppositifolius (Geiseler) Müll.Arg.	adji (T), cecewima (M)	plant, leaves	E, T	intestinal cleanse, postpartum cleanse, postpartum infections	168
Mangifera indica L.	amangagoto (F, G, N)	leaves, bark	HB, T	anemia, pregnancy	191, 382
Manihot esculenta Crantz	kootema (F)	leaves	D	anemia	NC
Melaleuca leucadendra (L.) L.	kpimansin semeton (S)	leaves	D	childbirth	395
Merremia tridentata (L.) Hallier f.	fakale (G)	leaves	T	infertility	NC
Milicia excelsa (Welw.) C.C.Berg	lokoma (F)	leaves	T	contraception	NC
Millettia thonningii (Schum. & Thonn.) Baker	assandjouman (S)	leaves	T	postpartum hemorrhage	398
Millettia thonningii (Schum. & Thonn.) Baker	assoinssoin (F), otietie (G, N)	leaves, bark	T	anemia, galactagogue, infertility, intestinal cleanse, pregnancy, vaginal cleanse	501
Mimosa quadrivalvis var. *leptocarpa* (DC.) Barneby	ahossiboasa (F)	leaves	T, D	HBP, childbirth, HBP, pregnancy	302, 581
Mitragyna inermis (Willd.) Kuntze	lagpatima (M)	leaves	T	STIs	171
Momordica charantia L.	gninsinkin (F)	plant, fruit, leaves	EA, E, T, VW	abortion, anemia, contraception, HBP, intestinal cleanse, postpartum infections, STIs, pregnancy, vaginal cleanse	361
Monodora myristica (Gaertn.) Dunal	sassalikoun (F)	bark, seeds	A, T, V, VW	anemia, galactagogue, infertility, menstruation, postpartum infections, STIs	119, 184, 308
Morinda lucida Benth.	koinsido (F)	leaves, root, bark	A, T	abortion, anemia, contraception, cysts, fibroids, intestinal cleanse, postpartum cleanse, menstruation	112, 321
Moringa oleifera Lam.	kpatiman (F, G), patovide (M)	leaves, bark	E, P, T, VW	childbirth, cysts, fibroids, HBP, STIs, pregnancy	NC
Newbouldia laevis (P.Beauv.) Seem.	dèsèsiigièma (F), akoko (N)	leaves	T, D	anemia, HBP, pregnancy	NC
Nicotiana cf. *tabacum* L.	azoma (F)	leaves	V	galactagogue	NC
Ocimum americanum L.	hissihissi (F)	plant, leaves	T, HB, VW	postpartum infections, pregnancy, STIs, vaginal cleanse	701
Ocimum basilicum L.	kesukesu (M)	leaves	T	menstruation	143
Ocimum gratissimum 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
Ocimum 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

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Olax subscorpioidea Oliv.	mitindo (F, G, N)	root	T	cysts, fibroids, infertility, intestinal cleanse, menstruation	329
Oldenlandia affinis (Roem. & Schult.) DC.	ahonhoun (F, G)	plant, leaves	T	childbirth, infertility	206, 313
Parinari curatellifolia Planch. ex Benth.	iyafo (T)	leaves	E	pregnancy	650
Parkia biglobosa (Jacq.) G.Don	ahouagoto (F)	leaves, bark, seeds	T, D, P, EN	hemorrhoids-internal, HBP, postpartum cleanse	384
Paullinia pinnata L.	hèdoulifindo (F)	root, leaves	A, E, D, T, VW	anemia, contraception, HBP, menstruation, pregnancy	125
Pavetta corymbosa (DC.) F.N.Williams	lohou (F)	root, leaves	D, T, VW	infertility, pregnancy, vaginal cleanse	312
Pennisetum cf. *glaucum* (L.) R.Br.	mil (Fr)	leaves	D, T	anemia	NC
Peperomia pellucida (L.) Kunth	fifaman (F)	leaves	T	infertility	323
Pergularia daemia (Forssk.) Chiov.	abognfufu (T)	leaves	E	galactagogue, pregnancy	283, 640
Periploca calophylla (Baill.) Roberty	honman (F)	leaves	T	pregnancy	NC
Persea americana Mill.	avocaman (F, G)	leaves	T, D	anemia, HBP, malaria, pregnancy	NC
Phaulopsis ciliata (Willd.) Hepper	chouchougrouchou (F)	plant		protection against spirits	200
Phyllanthus amarus Schumach. & Thonn.	hlinwé (F, G)	plant, leaves	E, T, VW	HBP, intestinal cleanse, menstruation, postpartum cleanse, pregnancy	239, 344, 642
Phyllanthus muellerianus (Kuntze) Exell	agemukogu (T)	root	T	anemia	296
Phymatosorus scolopendria (Burm. f.) Pic. Serm.	degoma (F, G, N)	leaves	VW, T	STIs, pregnancy	120, 377
Physalis cf. *angulata* L.	korogba (N)	plant	T, VW	STIs, vaginal cleanse	NC
Piper guineense Schumach. & Thonn.	piment du guinea (Fr)	fruit, leaves	E, T	contraception, CBD loudjo, pregnancy	NC
Platostoma africanum P.Beauv.	koumobaokuta (T)	leaves	E	pregnancy	648
Polygala arenaria Willd.	mli (F)	plant		infection	205
Portulaca oleracea L.	denkama (F)	plant	EA	pregnancy	110
Prosopis africana (Guill. & Perr.) Taub.	kakema (F)	plant	T, HB, VW	postpartum infections	NC
Psidium guajava L.	guave (Fr)	fruit	E	pregnancy	NC
Pterocarpus erinaceus Poir.	kosso (G, S), eweakpekpe (N)	bark, leaves	T	anemia, cysts, fibroids, menstruation	379
Pterocarpus santalinoides DC.	gbètin (F)	leaves	T	infertility, stomachache	NC
Pycnanthus angolensis (Welw.) Warb.	yayado (F)	root	T	anemia	NC
Raphia sp.	dema (F, M)	wood, leaves	T	placenta removal	NC
Rauwolfia vomitoria Afzel.	vonmausin (G)	leaves	T	pregnancy	374
Rhaphiostylis beninensis (Hook.f. ex Planch.) Planch. ex Benth.	kplakplakando (F)	wood, leaves, root	T, D	intestinal cleanse, menstruation, postpartum cleanse	129 500
Ricinus communis L.	tondedji (F)	leaves	D	abortion, intestinal cleanse, menstruation	NC
Rourea coccinea (Schumach. & Thonn.) Benth.	vikplomba (F, G, S)	leaves	T, E	anemia, infertility	167
Sabicea calycina Benth.	aviama (F, S)	plant, leaves	VW	STIs, pregnancy	391
Saccharum officinarum L.	canne asucre (Fr)	stem	T	anemia	NC
Sansevieria sp.	kpoyando (G)	root	T	infertility	NC

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Sarcocephalus latifolius (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
Schwenkia americana L.	zron (F)	plant	D, T	childbirth, pregnancy	324, 352
Secamone afzelii (Roem. & Schult.) K.Schum.	zoucoutou (F), anonsiman (F)	plant, leaves	E, T	anemia, galactagogue, infertility, postpartum infections, pregnancy	322, 349, 639, 597
Securidaca longipedunculata Fresen.	abiwèrè (F, G, N)	leaves	T, D, VW	childbirth, infertility, menstruation, postpartum cleanse, pregnancy, vaginal cleanse	318, 336
Senna alata (L.) Roxb.	amasou (F)	leaves, flower	T, A	cysts, fibroids, intestinal cleanse, menstruation	343, 502
Senna italica Mill.	agwègbé (F)	leaves	D, T	constipation, intestinal cleanse	307
Senna obtusifolia (L.) H.S.Irwin & Barneby	kpanwoun (S)	leaves	T	anemia	NC
Senna occidentalis (L.) Link	agonlika (F), ajambulu (T)	leaves	EN	intestinal cleanse	241
Senna siamea (Lam.) H.S.Irwin & Barneby	cassia (F, M)	leaves	T, HB	abortion, childbirth, postpartum cleanse, CBD loudjo, menstruation, pregnancy	165
Sesamum indicum L.	sesame (Fr)	plant, seeds	E, A	menstruation, postpartum infections, pregnancy	NC
Sida acuta Burm.f.	agbegbema (F), etchokotou (G, N)	leaves, root, whole plant	D, E, T, VW	contraception, intestinal cleanse, menstruation, postpartum cleanse, pregnancy	509, 534, 611
Sida cf. *cordifolia* L.	agbidi (F)	leaves	T	postpartum hemorrhage	NC
Smilax anceps Willd.	aglbaliklaklan (F)	root		cysts, fibroids, menstruation	186
Solanum aethiopicum L.	gblèman (F)	leaves	EA	STIs, vaginal cleanse	566
Sorghum arundinaceum (Desv.) Stapf	jehooma (M)	leaves	T	STIs	172
Sorghum bicolor (L.) Moench	adako (F), okaono (T)	leaves	T	anemia, menstruation	247
Sorghum sp.	le sorgho (Fr)	seeds	EA	infections	NC
Spathodea campanulata P.Beauv.	adade (G, N, S)	plant, leaves, bark	T, VW	HBP, infertility, menstruation, pregnancy, STIs	363, 390
Spondias mombin L.	akikon (F)	leaves, bark	T, VW	HBP, malaria, menstruation, vaginal cleanse	128, 360, 494, 635
Stachytarpheta cayennensis (Rich.) Vahl	alotrohe (S)	plant	T	menstruation	387
Stereospermum kunthianum Cham.	adjadey (T)	leaves, root	E, CS	pregnancy	643
Strophanthus hispidus DC.	tchakpa (F), inchao (T)	root, leaves	E, T	childbirth, cysts, fibroids, menstruation, pregnancy, stomachache	277, 350, 358
Struchium sparganophorum (L.) Kuntze	acodigoue (S)	plant	T	anemia	385
Syzygium aromaticum (L.) Merr. & L.M.Perry	atinkingbadota (F)	flower buds	T, V, A, VW	anemia, galactagogue, contraception, infertility, intestinal clenase, menstruation, postpartum infections, STIs	116
Syzygium guineense (Willd.) DC.	mlammido (N)	root	VW	vaginal cleanse	NC
Tapinanthus globiferus Tiegh.	hansimlin (F)	leaves	T	anemia	571
Tectona grandis L.f.	teckdo (F)	leaves, root	HB, T	anemia	NC

Botanical Name	Local Name[a]	Used part	Preparation[b]	Use category[c]	AMT#[d]
Terminalia glaucescens Planch. ex Benth.	alotoun (F)	root, leaves	T, VW	intestinal cleanse, menstruation, vaginal cleanse	305, 627
Tetrapleura tetraptera (Schum. & Thonn.) Taub.	lindja (F)	fruit	VW, T	infertility, menstruation, postpartum infections, STIs, vaginal cleanse	304
Tridax procumbens (L.) L.	kpokpo (F, G)	plant	T	anemia, cysts, menstruation	512
unidentified (AMT 271)	indi (T)	root	T	postpartum infections	271
Uvaria chamae P.Beauv.	aylahado (F)	root, leaves	T	anemia, infertility, menstruation, pregnancy	126, 529
Vepris verdoorniana (Exell & Mendonça) Mziray	agbede (S)	leaves	T, VW	anemia, contraception, infertility, menstruation	386
Vernonia amygdalina Delile	amavive (F)	leaves, whole plant	E, HB, T	galactagogue, postpartum infection, pregnancy, vaginal cleanse	491, 645
Vitex doniana Sweet	foman (F)	leaves, root	T, A	hemorrhoids, menstruation	570
Waltheria indica L.	atasu yonunuvima (F), misomituwey (M), kasa (T)	Plant, leaves, root	D, T	anemia, infertility, intestinal cleanse, menstruation, postpartum hemorrhage	130, 253, 565
Xylopia aethiopica (Dunal) A.Rich.	kpédjrékoun (F)	fruit	T, A, VW	anemia, contraception, infertility, menstruation, postpartum infections, STIs	NC
Zanthoxylum sp.	heja (M)	leaves	T	intestinal cleanse	NC
Zanthoxylum zanthoxyloides (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
Zapoteca portoricensis (Jacq.) H.M.Hern.	akanmoun (F)	root	T, A	abortion, contraception	NC
Zea mays L.	gbade (F)	flower stigmas (silk), fruit	T, D, E	anemia, galactagogue, cysts, fibroids	NC
Zingiber officinale 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)= Seto; (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]
Abelmoschus esculentus (L.) Moench	etatam (F), gombo (Fr), dongodongo(B), mibodo (B)	leaves, fruit	EN, VI, E	childbirth, pregnancy	845
Abutilon mauritianum (Jacq.) Medik.	odongi		D or EN	childbirth	NC
Acalypha paniculata Miq.	oekoenkoenakoen (F)	leaves	VI	childbirth, pregnancy	844
Acanthus montanus (Nees) T.Anderson	nvovo (F), pachango (M)	leaves	EN, D, E, T	childbirth, galactagogue, menstruation	1367, 1317
Aframomum citratum (C.Pereira) K.Schum.	azum (F)	leaves, root	EN	menstruation, stomachache before delivery	NC
Aframomum giganteum (Oliv. & D.Hanb.) K.Schum.	obadzom (F)	fruit	SiB	pregnancy	NC
Aframomum sp.	piment indigiene (Fr), ontonou (Ob)	fruit, leaves, stem	S, VI, EN, EA, D	hemorrhoids, pregnancy, stomachache, vaginal cleanse	1152
Afrostyrax cf. sp.	mujumbu	bark	EN, D	infertility, postpartum infections	NC
Ageratum conyzoides (L.) L.	etombijoro (Om), hediki (M)	plant, leaves	VI, D	menstruation, vaginal cleanse	1318
Albizia sp.	evovule sak (F)	leaves, plant	VI, EN	cyst, stomachache, vaginal cleanse	876, 1228
Alchornea cordifolia (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
Allium cepa L.	oignon (Fr)	stem	T	HBP	NC
Allium sativum L.	ail (Fr)	stem	T	HBP	NC
Alstonia cf. *boonei* De Wild.	ekoek (F)	bark	D	vermifuge	855
Alstonia congensis Engl.	makouka (B), okouka (M)	bark	T, D	bodyache, galactagogue, menstruation, stomachache	846, 1190
Amaranthus cruentus L.	folon (F)	leaves, plant	EN, E	childbirth, contraception	1240
Amaryllidaceae sp.	molongu (F)	tuber	EN	pregnancy	869
Annickia affinis (Exell) Versteegh & Sosef	nfo (F)	bark	D, T, VW, VI	anemia, childbirth, HPB, pregnancy, STIs	NC
Annona cf. *senegalensis* Pers.		root	D	HBP	NC
Annona muricata L.	corossolier (Fr)	leaves, bark	T, EN	HBP, pregnancy	871
Anonidium mannii (Oliv.) Engl. & Diels	ebom (F)	bark	EN	protect fetus, pregnancy	NC
Anthocleista cf. sp.	ayindo (F)	bark	T	HBP	765
Anthocleista vogelii Planch.	monduando (B, M)	bark, leaves	D, E	general good health, HBP, menstruation, STIs	1258

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

Botanical Name	Local Name[a]	Used part	Preparation[b]	Use category[c]	AMT#[d]
Commelina cf. *diffusa* Burm.f.	essang (F)	leaves	VI	vaginal cleanse	1362
Costus afer Ker Gawl.		flower	T	STIs	NC
Costus sp.	myen (F)	plant, leaves	HB, D, EN	anemia, fibroids, cysts, galactagogue, pregnancy, menstruation, postpartum hemorrhage, vaginal cleanse, vermifuge	NC
Cucumeropsis mannii Naudin	inzaka (B, M), concombre traditionnel (Fr)	fruit, seeds	D, E	childbirth, infertility	854
Cyathula prostrata (L.) Blume	diztaztu (Ok), chabanakoko (B)	flower, plant		HBP, vaginal cleanse	1294, 1400
Cylicodiscus gabunensis Harms	edum (F)	bark	D, HB, T	anemia, pregnancy, vermifuge	NC
Cymbopogon citratus (DC.) Stapf	tisane (Fr)	leaves	T	HBP	NC
Cymbopogon sp.	citronelle (Fr)	leaves, root, stem	SB, D, T	HBP, STIs, pregnancy	NC
Dacryodes cf. *edulis* (G.Don) H.J.Lam	osigi (Ob)	leaves	VI	vaginal cleanse	1181
Daniellia klainei A.Chev.	oengay (B)	bark	T	contraception	1268
Desmodium adscendens (Sw.) DC.	obumen zeney (F)	leaves	E	infertility	NC
Dinophora spenneroides Benth.	massessi (B)	leaves	VI	vaginal cleanse	1194
Dioscorea bulbifera L.	ebouba (M)	fruit	EA	abscesses	1312
Dioscoreophyllum volkensii Engl.	tziga (F)	plant	D	postpartum hemorrhage	1249
Drypetes sp.	esop (F)	innerside bark	VI	vaginal cleanse	878
Elaeis guineensis Jacq.	essong (F)	heart, oil, leaves	E, D	contraception, galactagogue, infertility, placenta removal	NC
Emilia coccinea (Sims) G.Don	alonvoe (F)	leaves	D	menstruation	825
Ethulia cf. *conyzoides* L.f.		leaves	VI	postpartum infections	NC
Euphorbia hirta L.	derebelli (Os)	plant	E	childbirth	1411
Ficus cf. *thonningii* Blume	atak (F)	bark	D, EN, HB	galactagogue, infertility, pregnancy	NC
Ficus exasperata Vahl	ako (F)	bark	D	childbirth, pregnancy	848
Ficus mucuso Welw. ex Ficalho	ekoko (F)	leaves, bark	D, T	anemia, backache	826
Flagellaria cf. *guineensis* Schumach.	enganisang (F)	leaves	EN	postpartum hemorrhage	NC
Fleroya ledermannii (K.Krause) Y.F.Deng	tobu (M), epoukou (M)	bark	D	contraception, infertility, menstruation, pregnancy	897
Funtumia africana (Benth.) Stapf	otanda (B)	bark	D, T	galactagogue	1287
Gnetum africanum Welw.	nkoumou (Ob)	leaves	E	pregnancy	824
Gossypium barbadense L.	coton (Fr)	leaves	T, D	HBP, postpartum hemorrhage	NC
Gouania longipetala Hemsl.	musangia (B)	bark	D	vaginal cleanse	1276
Guibourtia tessmannii (Harms) J.Leonard	obaka (B, M), kevasingo (F)	bark	D, T	diabetes, HBP, infertility, postpartum hemorrhage, pregnancy	764
Halopegia azurea (K.Schum.) K.Schum.		leaves	L	pregnancy	NC
Harungana madagascariensis Lam. ex Poir.	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]
Heterotis rotundifolia (Sm.) Jacq.-Fél.	ekaso (F)	plant	VI	vaginal cleanse	1248
Heterotis sp.	ekaso (F)	plant	VI	STIs	NC
Hibiscus sp.	lesseille (F)	flower, leaves	D, E, VI	anemia, vaginal cleanse, pregnancy	NC
Hymenocardia acida Tul.	onganana (Ob)	leaves	D	galactagogue	1155
Hymenocardia ulmoides Oliv.	esang (F)	leaves	VI	stomachache, vaginal cleanse	847
Inga edulis Mart.		seeds	VW	fibroids, cysts	NC
Irvingia gabonensis (Aubry-Lecomte ex O'Rorke) Baill.	andofan (F), mangue sauvage (Fr)	fruit, bark	D, EN	galactagogue, infertility, menstruation	1356
Justicia secunda Vahl	fleur rouge (Fr)	plant, leaves	T	anemia	805, 986
Keetia sp.	ratta (F)	bark, leaves	D, VI	infertility, menstruation, vaginal cleanse	766
Lagenaria cf. sp.	calabasse (Fr), londuh (F)	fruit	B	placenta removal	NC
Laggera cf. *alata* (D.Don) Sch.Bip. ex Oliv.	tabac de pygmée (Fr)	leaves	D	fibroids, cysts	NC
Landolphia cf. *owariensis* P.Beauv.	pondzie	leaves	D	anemia, galactagogue, contraception	NC
Lantana camara L.		leaves	T	malaria	1188
Laportea cf. *aestuans* (L.) Chew	terakun (F)	plant	E, VI	childbirth	NC
Laportea cf. *ovalifolia (Schumach. & Thonn.) Chew*	dipakazangoue (Ok)	leaves		contraception	NC
Leea guineense G.Don	mbala (Om)	bark	D	childbirth	NC
Leguminosae sp.		bark	T	menstruation	1304
Lippia adoensis Hochst. ex Walp.	mututu	leaves	T	galactagogue	NC
Lippia cf. *rugosa* A.Chev.	afing (F)	leaves	T	galactagogue	760
Lippia multiflora Moldenke	punya (S), tisane sauvage (Fr)	leaves	T	HBP, galactagogue	1410
Lippia sp.	lewayi (Ob)	leaves	D	menstruation, postpartum cleanse, postpartum hemorrhage	1179
Macaranga spinosa Müll.Arg	asas (F)	leaves	HB, E, SB, VI	pregnancy, menstruation, vaginal cleanse, diarrhea	1192, 1197
Maesopsis eminii Engl.	enkale (F), mongobe (B)	bark	EN, T	infertility, galactagogue	879
Mangifera indica L.	mangue (Fr)	bark, leaves	VW, T	menstruation, postpartum infections, STIs, stomachache	839
Manihot esculenta Crantz	manioc (Fr)	leaves, tuber	E, EN, D	childbirth, galactagogue, postpartum hemorrhage, pregnancy	NC
Mikania chenopodifolia Willd.	madamoiselle (Fr)	plant	SiB	pregnancy	1242
Milicia excelsa (Welw.) C.C.Berg	abang (F)	leaves, bark	D	galactagogue	835, 836, 1368
Millettia cf. *versicolor* Baker	banjanjoko (B)	bark	T	general good health	1306
Momordica charantia L.	mabululu	leaves	D	contraception	NC
Morinda lucida 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]
Musa sp.	umbolokon (F)	leaves, fruit, bark	D, E, EN, SB	anemia, backache, childbirth, galactagogue, menstruation, placenta removal, STIs, vaginal cleanse, vermifuge	NC
Musanga cecropioides R.Br. ex Tedlie	mohombo (B)	leaves	D	childbirth	985, 1309
Myrianthus arboreus P.Beauv.	angokon (F)	bark	D, EN	pregnancy, postpartum cleanse, postpartum infections	853, 1073
Nicotiana tabacum L.	taba (F)	leaves	EN	CBD zchaw, pregnancy	NC
Nymphaea lotus L.	otoetoe (F)	leaves	VI	vaginal cleanse	NC
Ocimum americanum L.	sizey (S)	leaves	T, D	galactagogue, placenta, postpartum cleanse	1407, 1142
Ocimum gratissimum L.	messep (F), masipetzipo (Os)	leaves, plant	D, T, VI	galactagogue, malaria, menstruation, pregnancy, vaginal cleanse, vaginal cleanse	1072, 1409, 1412, 1143
Ocimum sp.	dziandzie (P)	leaves	D	fibroids, cysts	NC
Oryza sativa L.	riz (Fr)	seed	E	galactagogue	NC
Passiflora foetida L.	ejeszum (F)	stem, leaves	EN	infertility, vermifuge	849
Pentaclethra macrophylla Benth.	mpandzi (M), ompie (T)	bark, fruit	EN, D, VW, E	pregnancy, stomachache, vaginal cleanse	1077, 1263
Perichasma cf. *laeticata* Miers	enzigue (F)	root	E	pregnancy	NC
Periploca nigrescens Afzel.	alarminson (F)	leaves	VI	vaginal cleanse	NC
Persea americana Mill.	avocat (Fr)	leaves	T, VI	HBP, vaginal cleanse	982
Petersianthus macrocarpus (P.Beauv.) Liben	abing (F)	bark, leaves	L, SiB, D, S, VI	anemia, backache, pregnancy, vaginal cleanse	1220
Phyllanthus sp.	kanguh (F)	plant	VI	vaginal cleanse	1245
Picralima nitida (Stapf) T.Durand & H.Durand	dumavendo (B, M)	fruit, bark	EN, D	fibroids, cysts, malaria, vermifuge, HBP	1250, 1316
Piper umbellatum L.	abomanzan (F)	plant, leaves	SiB, EN, SB	hemorrhoids, infertility, placenta removal, pregnancy, vaginal cleanse	761
Piptadeniastrum africanum (Hook.f.) Brenan	nlouey (F)	leaves, bark	L, EN	CBD mfoes, infertility	1219
Pistia cf. *stratiotes* L.	angoun (F)	plant	E	infertility	NC
Plagiocladus diandrus (Pax) Jean F.Brunel	mbango (B)	leaves	E	anemia, HBP	1260
Plagiostyles africana (Müll.Arg.) Prain	eleesula (F)	bark	EN	menstruation, postpartum infections	NC
Plectranthus monostachyus (P.Beauv.) B.J.Pollard	echipo (M)	plant	D	headache	1319
Poga oleosa Pierre	oayko (M)	plant	EA	sores	1314
Portulaca oleracea L.	dikamiya (Ok)	leaves	T	childbirth	1402
Pseudospondias longifolia Engl.	ofoss (F)	bark	D, EN, T	anemia, stomachache	1081
Psidium guajava L.	guave (Fr)	leaves	SB	malaria, vaginal cleanse	NC
Pteridium aquilinum (L.) Kuhn	ebango (B)			childbirth	1274

Botanical Name	Local Name[a]	Used part	Preparation[b]	Use category[c]	AMT#[d]
Pterocarpus soyauxii Taub.	umbel (F), kaolin rouge (Fr)	bark	D, T, SiB	anemia, galactagogue, inferility, placenta removal, pregnancy, STIs	880, 1203
Pycnanthus angolensis (Welw.) Warb.	mitchoko (B)	bark	T	anemia	NC
Quassia cf. *africana* (Baill.) Baill.	icindural (P)	root	T	HBP	763
Rauvolfia vomitoria Afzel.	tchwele (Ob)	bark	SiB	menstruation	1161
Saccharum officinarum L.	canne sucre (Fr)	juice, stem, plant	D, EN, T	fibroids, cysts, HBP, menstruation	829
Santiria cf. *trimera* (Oliv.) Aubrév.	outou (F)	resin, bark	S	CBD zchaw	NC
Sarcocephalus latifolius (Sm.) E.A.Bruce	ondolo (Ob)	fruit, bark	D, EN	galactagogue, stomachache	1156
Scleria boivinii Steud.	zengey (B)	leaves	D	postpartum hemorrhage, stomachache	1307
Scoparia dulcis L.	nzonzo (F), zedsoro (F)	leaves	D	childbirth	1364
Scyphocephalium cf. *ochocoa* Warb.	sogo (F)	bark	E	menstruation	NC
Selaginella myosurus Alston	ehoyi (M), mahoy (B)	leaves	E	pregnancy, HBP	1063, 1198
Senna alata (L.) Roxb.	kinkiliba (F)	leaves	D, T, S	infertility, STIs	1320
Senna occidentalis (L.) Link	ngari (Ob)	leaves	EA, E	stomachache	1184, 1366
Sida acuta Burm.f.	nzisim (F)	leaves, stem, plant	D, EN, W, SiB, VI	childbirth, CBD ona/onyaboom, CBD les urines, pregnancy, postpartum cleanse	828, 1401, 1177, 1406, 1151, 1254, 1237
Solanecio angulatus (Vahl) C.Jeffrey	moyamboa (B)	leaves	D	childbirth	1298
Solanum americanum Mill.	otchango (M)	leaves	E, D	pregnancy	NC
Solanum anguivi Lam.	petit aubergine (Fr), omborоru (Ob)	fruit	D, T	galactagogue, menstruation, postpartum cleanse, postpartum hemorrhage	NC
Solanum lycopersicum Lam.	tomate (Fr)	fruit	D	anemia	NC
Strychnos cf. sp.		bark	SiB	vaginal cleanse	NC
Tabernanthe iboga Baill.	bois sacre (Fr)	root	E	anemia, contraception, HBP	NC
Tetracera alnifolia Willd.	movova/lian-aho (B)		D	STIs	1259
Tetrapleura tetraptera (Schum. & Thonn.) Taub.	tsélé (M)	fruit	T, EN	galactagogue, menstruation, pregnancy	NC
Tetrorchidium didymostemon (Baill.) Pax & K.Hoffm.	zili (F)	bark	D, EN	galactagogue, infertility, menstruation, postpartum infections	875
Theobroma cacao L.	cacaowey (F)	bark, fruit, leaves	D, T	anemia, HBP, postpartum cleanse	872, 1205
Tithonia diversifolia (Hemsl.) A.Gray	magariet (F)	leaves	D	HBP	NC
Treculia cf. *acuminata* Baill.	mpovo (B)	bark	D	fetus strengthener	1262
Treculia erinacea A.Chev.	edzip (F)	bark	T, EN	anemia, infertility	NC
Trichoscypha cf. *bijuga Engl.*	lokouta (B)	leaves	E	HBP	1299
Trichoscypha sp.	aboet (F)	bark	VW	postpartum cleanse	NC
Tristemma cf. *hirtum* P. Beauv.	masessa	leaves	VI	vaginal cleanse	NC
Tristemma littorale Benth.	abillebong (F)	leaves	VI	vaginal cleanse	861, 0873
Tristemma mauritianum 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
Urena lobata L	okon (F)	leaves	D	postpartum hemorrhage	1238
Vernonia amygdalina Delile		leaves		stomachache	1189
Xylopia aethiopica (Dunal) A.Rich.	oha (M)	leaves	E	HBP	1321

[a] Local languages are abbreviated: (B)= Babungu; (F)= Fang;(Fr)= French; (M)= Mitsogo; (Ob)= Obamba; (Ok)= Okande; (Om)= Omiene; (Os)= Ossimba; (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)= steambath; (SiB)= sitbath; (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.