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Full Length Research Paper

Plants used for female reproductive health care in Oredo local government area, Nigeria

Folu M. Dania Ogbe, Oyomoare L. Eruogun* and Marilyn Uwagboe

Department of Plant Biology and Biotechnolgy, University of Benin, Benin City, Nigeria.

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The state of maternal health in Nigeria is poor and can be attributed to inadequate access to reproductive health services, poverty and in some areas cultural resistance. Consequently, many rural people in Nigeria turn to ethno-medicinal health care systems due to accessibility, affordability, availability and an inherent trust in this method. These systems are threatened by erosion of plant diversity and ethno-medicinal knowledge, creating an urgent need for intensive documentation. Therefore, this paper presents an inventory, economic valuation, an evaluation of selected wild species for domestication and a non-experimental validation for the medicinal activity of plants used in Oredo Local Government Area, Benin City, Nigeria for female reproductive health care and gynaecological conditions. A total of 27 plants belonging to 20 families used in treating 16 female reproductive health and gynaecological conditions were recorded, and their medicinal activity validated non-experimentally. With the exception of two, all the plants documented are reported in scientific literature to have chemical constituents which exhibit medicinal activity. Economic value of medicinally useful plants in the local market ranged from < $1 - ≈ $6 per kg for fruits and leafy vegetables and < $1 per 10 g for spices. Most (92.31%) of these plants are common and abundant, indicating availability to people irrespective of level on the social scale particularly those in rural areas. *Rauvolfia vomitoria* and *Newbouldia laevis,* both wild multipurpose and locally important, with potential for industrial raw materials, can be domesticated and used to improve the livelihoods of rural communities.

Key words: Female reproductive health care, ethno-medicine, domestication, economic value.

INTRODUCTION

Plants have been used medicinally in all civilizations. Despite the effectiveness of chemically synthesized medicines, screening for plant drugs will continue for the development of new pharmaceuticals to resolve both old and new health problems. Medicinal plants have yielded drugs with high therapeutic value. Examples are aspirin (salicylic acid) from *Salix* spp. (Mahdi et al., 2006); precursors to other drugs e.g. the conversion of vinblastine in *Cantharanthus roseus,* effective in treating Hodgkin's disease, to vincristine for treating leukaemia. With the help of synthetic chemists, morphine for pain relief from *Papaver somniferum* became hydromorphine. In Nigeria, certain spices (e.g. *Xylopia aethiopica* seeds) are used in specific recipes and taken to regulate life processes and prevent diseases. Many yam species are used in herbal

*Corresponding author. E-mail: oyeruogun@yahoo.com. Tel: +2348027342444.

medicine. Okwu and Ndu (2006) investigated five *Dioscorea* spp. All had bioactive compounds – saponins, alkaloids, flavonoids, tannins and phenols, in addition to vitamins, calcium, magnesium, phosphorous, potassium and sodium.

A large proportion of Nigerians in the rural areas at some stage in their life turn to traditional or ethno-medicinal and alternative health care systems due to the acces-sibility, availability, affordability and inherent trust in this method. This observation agrees with the general estimate that 85% of the population in developing countries depend mainly on traditional health care systems (CGSPS, 2002). Furthermore, for Nigeria this development is not surprising as 70% of its estimated population of 138,283,240 with an annual growth rate of 2.38% are classified as poor (Nigeria 2006 Census Statistics; CIA, 2008), 70% of these poor people are women and 64% of them live in rural areas (Futures Group International, 2002; CGSPS, 2002). These figures demonstrate the greater depth and spread of poverty amongst Nigerian women and necessitate a focus on females living in remote rural communities (Obilade and Mejuini, 2005) in relation to their reproductive health.

Recent health status data show that in 2000, Nigeria's maternal mortality ratio per 100,000 live births ranged from 800 – 1100 (WHO, 2007; UNDP, 2008) as compared to low ratios for other countries with develop-ing economies, 56 for China, 84 for Egypt and 83 for Mexico (WHO, 2007). This trend of high maternal mortality is not new as past records show that towards the end of the twentieth century, Nigeria alone accounted for 10% of global maternal deaths (CGSPS, 2002) due to direct causes as bleeding in pregnancy, eclampsia, infection and anaemia in pregnancy. These figures are not unusual when considered with other information that demonstrate low quantity (access), quality (adequacy, efficiency and appropriateness) and utilization that characterize female reproductive health care in Nigeria (Obilade and Mejuini, 2005). For example, between 2000 and 2004, there were only 35 physicians per 100,000 people in Nigeria (UNDP, 2008) contributing to a low maternal and neonatal health service rating of 49 for Nigeria (Futures Group International, 2002). This situation is further compounded by the fact that 54.7% of Nigeria's population is in the 15 – 64 age bracket (CIA, 2008), with early onset of sexual activity estimated at just over 16 years (CGSPS, 2002), and a low contraception rate of 13% (UNDP, 2008). Therefore, the major issues, namely mass poverty with gross inequalities and inadequate access to health facilities, have not changed from what they were about a decade ago as identified by Harrison (1997) and Sule-Odu (2000).

Nigeria's rich and diverse flora is not excluded from the global threat of biodiversity erosion and disappearance due to loss of natural habitat, environmental change and anthropogenic activities such as urbanization, social development and deforestation (ACF, 2003; Okoli et al., 2007).

Moreover, a more subtle threat is the erosion of ethnomedicinal knowledge, characteristic of the culturally wealthy diverse ethnic groups of Nigeria. This can be attributed to oral transmission of ethno-medicinal knowledge which is associated with the danger of losing some useful information due to aging and death of the custodians of this knowledge (Maregesi et al., 2007), urban migration and a lack of interest by the younger generation.

These challenges shaped the objectives of our study which was carried out in Oredo Local Government Area (LGA), Edo State, Nigeria. We aimed to produce an inventory of the plants used by the people of Oredo LGA in treating female reproductive and gynaecological conditions and document how these plants are used. We adopted a focused approach and carried out a non-experimental validation of the plants used by examining literature on phytochemical/pharmacological information supporting the medicinal activity of any of the documented plants. Also, we aimed to determine the economic value of the documented plants sold in the local market as an indication of affordability and to evaluate selected wild inventoried species for domestication. We have defined reproductive conditions to include those that affect reproductive success through pregnancy, delivery and for the prevention of conception.

MATERIALS AND METHODS

Study site

Oredo Local Government Area of Edo State (Latitude: 6.35°N; Longitude: 5.3°E) with a total land area of 317.08 km^2, is located in Midwestern Nigeria and characterized by evergreen vegetation typical of a lowland rainforest belt (Figure 1). Due to its geographical location, Oredo LGA experiences a tropical climate with two major seasons; wet and dry. Annual rainfall ranges from 2300 – 2700 mm, concentrated in two peaks, July and September usually separated by a dry spell in August. Average annual tempe- rature ranges from 20 – 25°C with a mean monthly humidity range of 60 - 95%. Oredo LGA is mainly inhabited by the Bini people of Nigeria with the major occupation being farming, followed by trading, arts and crafts, brewing, cottage industry, and rubber processing and

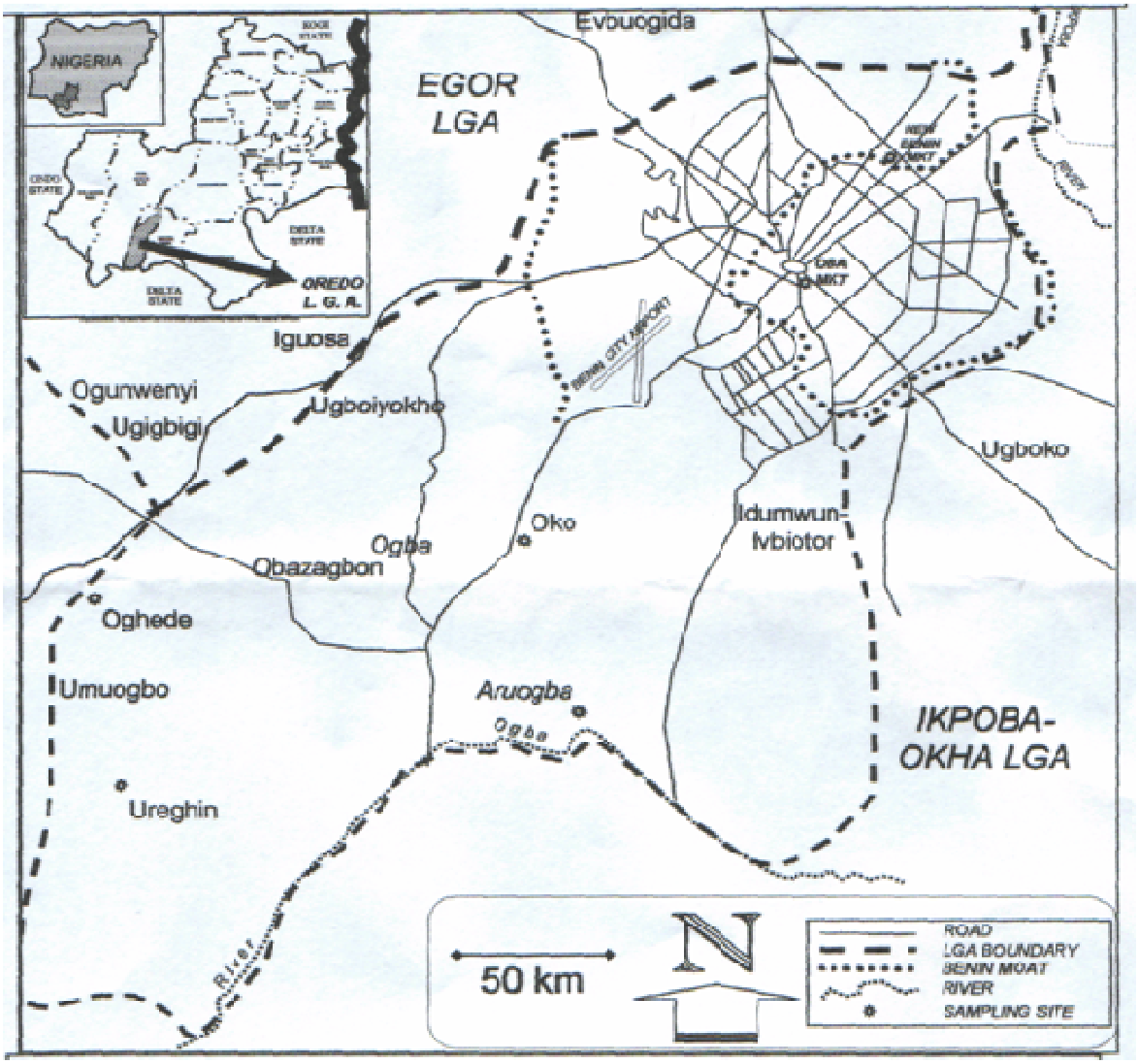

Figure 1. Oredo local government (LGA) showing sites.

trading. The agricultural system is predominantly small farm holdings.

Sampling frame

Sampling sites were randomly selected and include Oko, Oghede, Aruogba and Ureghin, all within Oredo LGA (Figure 1). Also, samples were taken from two markets (Oba market and New Benin market) within the LGA.

Methodology

Through the administration of a structured questionnaire in oral interviews, information was obtained from professional herbalists, local midwives, pregnant and post-partum women and knowledgeable old women in the LGA. The questionnaire contained pertinent questions relating to plants used for gynaecological conditions that occur before and after natal periods including ecology, mode of preparation and administration. Field guided walks were carried out by accompanying the practitioners during plant

Table 1. Plants used in Oredo LGA for antenatal conditions.

Condition	Plant species used	Family	Local name	Occurrence/status	Preparation and administration
Miscarriage	*Aframomum sceptrum* K. Schum.	Zingiberaceae	*Ehin-edo*	Common/wild	Topical application of dried ground seeds and fresh leaves of *Ocimum gratissimum* to lower portion of abdomen
	Ageratum conyzoides L.	Asteraceae	*Ebighedore*	Abundant/weed	Insertion of crushed leaves into vagina
	Chromolaena odorata (L) King and Robinson	Asteraceae	*Ebe-awolowo*	Abundant/weed	Oral consumption of decoction of leaves
	Commelina benghalensis L.	Commelinacea e		Abundant/weed	Cooked leaves in porridge is eaten
	Newbouldia laevis Seem.	Bignoniaceae	*Ikhimwin*	Common/wild	Oral consumption of decoction of leaves
	Ocimum gratissimum L.	Labiatae	*Ebe-aromwokho*	Common/cultivated	Topical application of fresh leaves and dried ground seeds of *Aframomum sceptrum* to lower portion of abdomen
	Sida acuta Burm. f.	Malvaceae	*Aramwemvbi*	Abundant/weed	Oral consumption of juice extracted from squeezed leaves
	Solenostemon monostachys (P. Beauv) Briq.	Labiatae	*Orakpuneoto*	Abundant/weed	Oral consumption of juice from squeezed leaves and salt
Nausea	*Carica papaya* L.	Caricaceae	*Uhoro*	Common/cultivated	Oral consumption of juice from squeezed leaves
	Citrus aurantifolia Swing.	Rutaceae	*Alimo-negiee*	Common/cultivated	Oral consumption of decoction of the stem and root bark
	Garcinia kola Heckel	Guttiferae	*Edu*	Occasional/cultivated	Occasional chewing of fruits
Veneral diseases	*Alchornia cordifolia* (Schum. and Thonn.) Muell. Arg.	Euphorbiaceae	*Unwosa*	Abundant/wild	Oral consumption of infusion of leaves
	Chromolaena odorata	Asteraceae	*Ebe-awolowo*	Abundant/weed	

collections. Digital pictures of plant samples were taken in the field and samples were collected, pressed and taken to the Department of Botany, University of Benin for identification (Akobundu and Agyakwa, 1987; Hutchinson and Dalziel, 1963; Arbonnier, 2004). The non experimental validation for the documented plant species was carried out using a modified version of method described in Lans (2007). This method mainly involved searching scientific literature for phytochemical/pharmacological data supporting the medicinal use of a plant species. Two wild species were evaluated for domestication based on multiple use, medicinal and ethnomedicinal importance. Also, an economic valuation of the medicinally useful parts of the inventoried plants was carried out by purchasing inventoried fruits, leafy vegetables and spices from the local markets, weighing them, and then converting their prices from the local currency to the USA dollar.

RESULTS

A total of 27 plant species in 20 families used in treating 16 different conditions were recorded. The conditions were categorised on the basis of when they occur in the female reproductive cycle, that is, during pregnancy (antenatal), at delivery, and after delivery (post-partum) and are presented in Tables 1 – 4. The tables also show a summary of the plant species used in treating these conditions, their local names, occurrence, status and mode of administration. A summary of some of the documented plants and literature discussing the scientific basis for their biological activity is presented in Table 5. The current economic value of medicinally useful plant parts in the local market is shown in Table 6. The most frequently employed route of administration was oral consumption (81.82%) while inhalation appeared to be the least preferred route of administration. Leaves were the most popular plant part utilized in herbal preparations (58.97%) while other parts were used infrequently includ-

Table 2. Plants used in Oredo LGA for treating other conditions that occur during pregnancy.

Conditions	Plant species used	Family	Local name	Occurrence/status	Preparation and administration
Anaemia	*Telfairia occidentalis* Hook f.	Curcurbitaceae	*Umwenkhen*	Common/cultivated	Leaf extract taken orally
Boils	*Anacardium occidentale* L.	Anarcadiaceae	*Ekasu*	Common/cultivated	Poultice of leaf ash ground with seeds *Aframomum sceptrum*
Constipation	*Ananas comosus* (L.) Merr.	Bromeliaceae	*Edin-ebo*	Common/cultivated	Fresh fruit is eaten
	Citrus aurantifolia	Rutaceae	*Alimo-negiee*	Common/cultivated	Mixture of juice with a pint of local gin taken orally
Cough	*Elaies guineensis* Jacq.	Arecaceae	*Udin*	Common/cultivated	Palm kernel oil mixed with sugar taken orally
Digestive problems	*Euphorbia heterophylla* L.	Euphorbiaceae	*Ege*	Abundant/weed	Leaf infusion taken orally
Malaria	*Azadirachta indica* A. Juss.	Meliaceae	*Dogoyaro*	Common/protected and semi-cultivated	Leaf decoction and that of *Cymbopogon citratus* taken orally
	Cymbopogon citratus (DC.) Stapf.	Poaceae	*Ebe-etin*	Common/cultivated	Leaf infusion taken orally
Pile	*Amaranthus spinosus* L.	Amaranthaceae	*Ebe-egban*	Common/weed	Leaf decoction taken orally with a pinch of salt

ing seeds (15.40%), fruits (7.69%), juice/sap (7.69%), roots (7.69%) and bark (2.56%). With regard to the frequency of occurrence of the plant species documented in this study, 65.39% are common, 26.92% are abundant and only 7.69% are occasional. While a large proportion (55.55%) of the inventoried plants is cultivated, 29.60% are weeds and only 14.82% are wild species.

DISCUSSION

The approach adopted in documenting ethno-medicinal knowledge is a vital issue with the potential to enhance research and development. This study adopted an approach focusing on plants used for female reproductive conditions in Oredo LGA. Although, this mode of investigation has not been widely adopted, several other studies have approached ethnobotanical surveys from a similar angle; examples include the work of Abo et al. (2000), which focused on plants used in the treatment of infertility and sexually transmitted diseases in South Western Nigeria, Tor-anyin et al. (2003), documented plants used for malaria fever by Tiv people and Abo et al. (2007), focused on plants used in the ethnomedicinal management of diabetes mellitus. The advantage of this approach is demonstrated by the incredible advances of medical science today which can be attributed in part to its organisation into specialized fields e.g. neurology, gynaecology, ophthalmology etc. This approach allows for a clear identification of untouched areas in the documentation of ethno-medicinal uses of plants that require urgent attention and prevents duplication of efforts. Thus, the information collected from different groups of people for the same condition would not only be documented but can be comparatively analysed with ease providing further information as to similarity, differences or frequency with which a particular plant is used for the same condition which is a good indication of efficacy (Maregesi et al., 2007).

The most common family reported in this study is Euphorbiaceae (4 species) while 4 other families (Asteraceae, Labiatae, Arecaceae and Poaceae) had 2 species each. Similar studies include Steenkamp (2003), which reported an inventory of 156 plants used for gynaecological conditions in South Africa, Lans (2007), reported on

Table 3. Plants used in Oredo LGA for treating conditions that occur during delivery.

Condition	Plant species used	Family	Local name	Occurrence/status	Preparation and administration
Pains during delivery	*Rauvolfia vomitoria* Afzel.	Apocynaceae	*Akata*	Common/wild	Leaf and root decoction consumed orally
Prolonged labour	*Aframomum sceptrum*	Zingiberaceae	*Ehien-edo*	Common/wild	Seeds chewed with roots of *Carica papaya*
	Carica papaya	Caricaceae	*Uhoro*	Common/cultivated	Roots of male plant chewed with 7 seeds of *Aframomum sceptrum*
	Cocos nucifera L.	Arecaceae	*Ivin*	Common/cultivated	Mixture of ground dried leaves and juice of *Citrus aurantifolia* rubbed into vagina
	Musa paradisiaca L.	Musaceae	*Oghede*	Common/cultivated	
	Sida acuta	Malvaceaae	*Aramwemvbi*	Abundant/weed	

reported on ethnomedicines used in Trinidad and Tobago for reproductive problems, Okoli et al. (2007) recorded 17 plants used for treating infertility, gynaecological and obstetric problems by the Esan people of Nigeria, and Abo et al. (2007), documented plants used for infertility and sexually transmitted diseases in Southwestern Nigeria.

Scientific basis for medicinal activity of documented plants

The non-experimental validation (Table 5) carried out in this study has shown that majority of the plants documented in this study have been reported in scientific literature to contain chemical components which exhibit medicinal activity e.g. saponins, tannins, steroids, flavonoids etc. For example, six out of the eight plants documented for treating miscarriage conditions contain flavonoids (Table 5). Akaneme (2008), has explained the possible mode of action of plant flavonoids in treating miscarriages; through their ability to prevent platelet aggregation (thinning of blood), thereby inhibiting the clotting pathway which is similar to the conventional treatment of recurrent miscarriage using daily doses of aspirin or heparin to achieve the same result (inhibit clotting pathway or thinning of blood).

Additionally, the efficacy of plants in treating gynaecological disorders and pregnancy related conditions have scientific basis. For example, some plant constituents are chemically or structurally similar to natural hormones and can be substituted in cases of hormone deficiency e.g. oestrone in the kernels of date and oil palm. Likewise, other plant constituents that differ in chemical structure from hormones may exert similar activity as the hormones. Still, other plant components may act indirectly on the secretion of certain hormones by stimulating or inhibiting the hypothalamus and the pituitary gland thereby controlling the function of most other glands. Another pathway may involve the removal of hormone inactivating compounds such as enzymes by plant constituents. Some plants contain alkaloids that exhibit antispasmodic action, haemostatic flavonoids, and essential oils which cause contractions of the uterus and abortion in high doses (De Wet, 2006).

The non experimental validation of the documented plants in this study (Table 5) has also demonstrated the effectiveness of ethno-medicinal solutions to female reproductive health conditions. An example with practical implications is the medicinal potential of *Telfairia occidentalis* in treating anaemia in pregnant women which is identified as one of the direct causes of the high maternal mortality rates in Nigeria. The haematinic property of extracts from this plant has been demonstrated in several studies (Dina et al., 2000; Caili et al., 2006).

Table 4. Plants used in Oredo LGA for treating post-partum conditions.

Conditions	Plant species used	Family	Local name	Occurrence/Status	Preparation and administration
Bleeding after delivery	*Sida acuta*	Malvaceae	*Aramwemvbi*	Abundant/Weed	Juice from squeezed leaves taken orally
	Solenostemon monostachys	Labiatae	*Orakpuneoto*	Abundant/Weed	Leaf infusion taken orally
Contraceptive	*Zea mays* L.	Poaceae	*Oka*	Common/Cultivated	Spoonfuls licked daily of a mixture of ground dried leaves and alligator pepper seeds
Reduced lactation	*Euphorbia hirta* L.	Euphorbiaceae	*Ebazigban*	Abundant/Weed	Leaf infusion taken orally
	Ocimum gratissimum	Labiatae	*Ebe-aromwokho*	Common/Cultivated	Consumption of cooked leaves in soup
	Solanum gilo L.	Solanaceae	*Ekhuerimwin*	Common/Cultivated	Fresh fruits eaten
	Xylopia aethiopica A. Rich	Annonaceae	*Unien*	Occasional/Cultivated	Soup prepared with ground seeds and other ingredients
Skin disease	*Ageratum conyzoides*	Asteraceae	*Ebighedore*	Abundant/Weed	Topical application of macerated leaves

Economic value of documented plants used for female reproductive health

Most plants (total of 92.31%) inventoried in this study are common and abundant, indicating availability to all irrespective of level on the social scale. This point is further emphasized by the affordable prices or cheap economic value of these plant materials in the local market as shown in Table 6. Recorded prices ranged from < $ 1 - ≈ $6 per kg for fruits and leafy vegetables with the cost generally increasing in the order of fruits < leafy vegetables. Spices had the highest economic value of the inventoried plants, but with their prices all ranging below $1 per 10 g. Therefore, these plant remedies are not only available and affordable to local people, but they also serve a dual role of medicine and food being important dietary sources of essential nutrients, vitamins and amino acids (Table 5). Also, their use is consistent with the global trend of turning to natural foods for their healing properties.

Evaluation of selected wild species for domestication

R. vomitoria Afzel, is a forest regrowth shrub or small tree not more than 9 m tall. It extends from Senegal to Egypt, East Africa, Zaire, Gabon. It flowers from January to May and can extend to July. Fruiting occurs from April to August (Keay, 1989). The plant is important medicinally. It has about 44 different phytochemicals, with about 50% found in the roots, 20% in the leaves and 30% in the whole plant. Reserpine, the alkalioid usually employed against hypertention is obtained commercially primarily from *R. vomitoria.* The alkaloid reduces high blood preasure and is used in the treatment of mental illness. Herbal preparations from the roots are used as a sedative, aphrodisiac or antispasmodic (Gaoue, 2006). Joan Campbell – Tofte has invented an anti-diabetic extract isolated from *R. vomitoria* and *Citrus aurantium* (USPTO Application #: 20060115543).

In Nigeria, *R vomitoria* is used as a medicine by the major tribes of the country (Gill, 1992). Despite its importance globally and nationally, the species is still in the wild and its conservation status is unknown. The plant is naturally propagated by seeds. Experimental studies by Ehiagbonare (2007), showed that maximum value obtained from seed germination was 50% while 80% rooted stem cuttings was observed from total immerse method.

Newbouldia laevis (P. Beauv) Seemann ex Bureau is a low branching tree up to 18 m high, 60 – 90 cm in girth with short twisted branchlets. Wood is pale brown, moderately hard. The plant extends from Senegal to Zaire and is found in secondary forest from Guinea Savannah to dense forests. Common and gregarious, it flowers from December to February and fruits from January to February. Seeds are winged, flattened and wind dispersed (Keay, 1989).

The leaves, roots and bark of the plant have been reported to be used for more than 25 medicinal purposes

Table 5. Non experimental validation for the medicinal activity of documented plants using phytochemical/pharmacological literature.

Plant species	Phytochemicals	Literature
Aframomum sceptrum	Diterpenoids, sesquitepenoids, arylalkanoids and flavonoids	Tane et al., 2005
Ageratum conyzoides	Monoterpenes and sequiterpenes, chromene, chromone, benzofuran and coumarin, flavonoids, triterpene and sterols, alkaloids and miscellaneous compounds	Okunade, 2002
Alchornia cordifolia	Isopentenyl guanidine, alkaloids, cardiac glycosides, saponins, phenolic and terpenoid compounds	Farombi, 2003
Amaranthus spinosus	Phenolic compounds, anthraquinone and cardiac glycosides	Kumar et al., 2008; Amin et al., 2006
Anacardium occidentale	Flavonoids, glucosides, glucose and (-)epicatechin, essential amino acids and fatty acids	Aremu et al., 2007; Kamtchouing et al., 1998
Ananas comosus	Alcohols, esters, aldehydes, ketones, mono- and sesquiterpenoids, and diastereomeric compounds	Umano et al., 1992
Azadirachta indica	Azadirechterpinol A, azadirechterpinol B, azadirachtoic acid and aliphatic constituents	Trag et al., 2005
Carica papaya	Carbohydrate, reducing sugar, alkaloids, glycoside, saponins, tannins, flavonoids, resin, proteins, terpenoids and acidic compound	Akaneme, 2008
Chromolaena odorata	Alkaloids, saponins, tannins, phlobatannins, anthraquinones, steroids, terpenoids, flavonoids, cardiac glycosides	Akinmoladun et al., 2007b
Citrus aurantifolia	Coumarins including limettin, bergapten, imperatorin and isopimpinellin	Tasneem, 1995
Cocos nucifera	Phenolic acids, chlorogenic acid, dicaffeoylquinic acid and isomers of caffeoylshikimic acid	Chakraborty and Mitra, 2008; Dey et al., 2005
Commelina benghalensis	Alkaloids, caffeine, volatile oil, wax	Parekh and Chanda, 2008
Cymbopogon citratus	Essential oils mainly consisting of α and β citrals, and myrcene	Onawunmi et al., 1984
Elaies guineensis	α, β, and γ carotenes, small amounts of lycopene, lutein and zeaxanthin, polyphenols	Farombi, 2003; Abeywardena et al., 2002
Euphorbia heterophylla	Saponins, phenols, terpens, diterpenes (phorbols), and mainly sugars such as xylose, maltose, galactose, lactose and lactulose	Falodun et al., 2006
Euphorbia hirta	Tannins, alkaloids, flavonoids, oxalate, phytate and saponins	Ogueke et al., 2007; Wallace et al., 1998
Garcinia kola	Biflavonoids, prenylated benzophenones and xanthones, chromanols, garcinoic acid, garcinal and δ-tocotrienol	Farombi, 2003
Musa paradisiaca	Carbohydrates, proteins, alkaloids, flavonoids, triterpenoids and glycosides	Tyagi and Bohra, 2002
Newbouldia laevis	Alkaloids, tannins, flavonoids, resin, proteins, oil, steroids, terpenoids, acidic compound	Akaneme, 2008
Ocimum gratissimum	Alkaloids, saponins, tannins, phlobatannins, anthraquinones, steroids, terpenoids, flavonoids, and cardiac glycosides	Akinmoladun et al., 2007a; Edeoga et al., 2006
Rauvolfia vomitoria	Rauwolfia alkaloids such as rauvanine, reserpine, ajmaline, rescinnamine, rauwolfine, serpentine, steroid-serposterol and saponin	Ehiagbonare, 2007; La Barre 1973; Heeg, 1977; Quevauviller et al., 1972.

Table 5. Contd.

Sida acuta	Alkaloids, glycoside, saponins, tannins, flavonoids, proteins, steroids, and terpenoids	Akaneme, 2008
Solanum gilo	-	-
Solenostemon monostachys	-	-
Telfairia occidentalis	Micro and macro elements (e.g. P, Mg, Fe and Zn), cyanide, tannins, oxalate, and phytate	Caili et al., 2006; Dina et al., 2000; Akwaowo et al., 2000
Xylopia aethiopica	Flavonoids, alkaloids, saponins, tannins, phenolic compounds, water soluble vitamins including ascorbic acid, thiamine, riboflavin and niacin	Okwu, 2004
Zea mays	Complex blend of terpenes (monoterpenes and sesquiterpenes)	Kollner et al., 2004

Table 6. Economic valuation of leafy vegetables, fruits and spices used in Oredo LGA for female reproductive conditions.

Fruits	Price ($)/Kg	Leafy vegetables	Price ($) / kg	Spices	Price ($)/ 10 g
Ananas comosus	0.33	*Ocimum gratissimum*	2.83	*Aframomum sceptrum*	0.36
Citrus aurantifolia	1.70	*Telfairia occidentalis*	1.42	*Cymbopogon citratus*	0.15
Cocos nucifera	0.77			*Xylopia aethiopica*	0.11
Elaies guineensis	0.34				
Garcinia kola	5.70				
Musa paradisiaca	0.81				
Solanum gilo	1.15				

(Arbonnier, 2004). This plant has also been reported to be used in female reproductive health care. Leaves are used to ease childbirth and to promote milk production (Arbonnier, 2004). An extract made from the leaves, used as a mouth wash was shown to arrest bacterial action in dental caries (Okeke, 2003). It is culturally important among different Nigerian tribes. The leaves are used in chieftaincy and traditional religious ceremonies. A multi-purpose tree, it is often planted as hedgerows and as a live fence. It occurs around groves and shrines. Osei–Bonsu and Anim–Kwapong (1998) carried out prelim-nary evaluation of some forest trees. They showed that *N. laevis* was slow growing from seedling transplant. Stem cuttings however gave 45% success.

The evidence from literature and our ethnobotanical survey shows the importance locally and the multiple uses of the two wild medicinal plants chosen.

R. vomitoria and *N. laevis* can tolerate a wide range of environmental conditions, considering their distribution in Africa. Germination and establishment rates of cuttings indicate that both species can be domesticated and cultivated in home gardens and in mixed cropping or agro-forestry systems. This will provide constant supply of the plant parts for herbal preparation in addition to conservation through increased use. Research and development of multipurpose wild medicinal plants together with the indigenous knowledge can be used to improve the livelihoods of rural communities. These species promise new source of industrial raw materials in African countries.

Conclusion

We have seen from this study that ethno-medicines are used for a range of female reproductive conditions in Oredo LGA including some of the direct causes of maternal mortality in Nigeria. However, several factors threaten the continued transmission of ethno-medicinal knowledge and promote the fast disappearance of useful plant species. The first step to overcoming this challenge and improving on the drawbacks associated with ethno-medicinal practices is an intensive documentation of indigenous knowledge. This implies recording informal taxonomy and organizing it in an orthodox manner. Docu-

mentation which is focused, specialized and subjected to a non-experimental validation as an indication of efficacy, as described in Lans (2007) can enhance the search for natural plant products. Additionally, since ethno-medicines are affordable, accessible and available to all irrespective of level on the social scale we recommend that the next step after documentation should be an experimental validation of efficacy and establishment of effective dosage. Cultivation of wild medicinal plants in mixed cultures and agro-forestry systems should be encouraged for conservation and the production of improved varieties. Finally, it is imperative that the Government considers incorporating the use of ethno-medicines into the National Reproductive Health Policy and Strategy on the basis of affordability and availability to rural women who constitute majority of Nigeria's poor population and do not have access to adequate to health facilities.

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