



WILLINGNESS OF HERBAL MEDICINE PRACTITIONERS AND HERBS VENDORS TO CONTRIBUTE FINANCIALLY TO CONSERVATION OF MEDICINAL PLANTS IN IBADAN, NIGERIA

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ABSTRACT

The study evaluated the willingness of Herbal Medicine Practitioners (HMPs) and Herb Vendors (HVs) in Ibadan, Nigeria to contribute financially to medicinal plants conservation projects. Data was collected using structured questionnaires administered on 124 HMPs and 83 HVs randomly selected from fourteen herbal associations and marketers respectively. Results showed that 79.03% of all HMPs were males and 20.97% females while 83.13% of HVs were females and 16.87% males. All the HMPs and 97.59% of HVs were willing to contribute financially and provide useful information to conservation projects. Majority (54.84%) of the interviewed HMPs were willing to contribute between N500 - N1500 annually while most of the HVs (51.8%) were willing to contribute between N201 - N500 annually. Lack of financial power and land were identified as major constraints to holding private gardens. A total of 38 commonly used medicinal plant species was identified in the existing small scale private gardens of HMPs. There is need to organise the HMPs and HVs into formidable cooperative societies for easy access to fund and institute awareness campaign on the need for conservation of important local medicinal plants if the health for all dream is to be achieved.

Keywords: Willingness to pay, medicinal plants, conservation, Nigeria.

INTRODUCTION

Medicinal plants play a crucial role in health care needs of people around the world especially in developing countries (Bekalo *et al.* 2009). People living in remote areas of developing countries in West Africa depend extensively on traditional medicine as modern medical facilities are mostly out of reach (Mahonge *et al.* 2006; Feyssa *et al.* 2015). Globally, medicinal plants play vital roles in the advancement of modern studies by serving as a starting point for the development of novelty drugs for

debilitating ailments such as diabetes mellitus and chronic cancer conditions (Pramono 2002). Schippman *et al.* (2002) observed that an estimated 2500 medicinal plant species are traded internationally. Most of these plants are obtained from wild sources in developing countries by subsistence rural populations as means of livelihood. Much of primary health care needs of most inhabitants in developing countries are met by indiscriminate harvesting of poorly managed natural forest. Over exploitation of these wild sources has



subjected many species to extinction, threatened or endangered status (Omobuwajo *et al.* 2008). Population explosion in developing countries has also exerted undue pressure on frequently used medicinal plants and natural resources in general. As the demand for medicinal plants products increases, wild populations of plants are in turn being depleted (Raiet *al.* 2000).

Population explosions, inadequate drug supply, high cost of treatments in modern/orthodox hospitals, side effects of several allopathic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments (Joy *et al.* 2001). It has been estimated that 80% of about 4 billion people in developing countries of the world cannot afford orthodox drugs and have to depend upon use of plant materials for their medicines (Brindha *et al.* 2008). Herbal Medicine Practitioners (HMPs) in their large numbers rely exclusively on local medicinal plants for health care delivery in rural areas where about 70% of people in developing African countries resides. Therefore, there is a need to look into the conservation of these medicinal plants and the support for conservation by local HMPs.

Recently, there has been an increase in public interest in the use of plants as medicines globally based on the assumption that these plants will be available in perpetuity. However, no concerted effort has been made to ensure sustainable supply of medicinal plants, especially those sourced from tropical Africa, despite threats posed by increasing demand (Oladele and Adewunmi 2008). Explosive human population in non-industrialised countries is associated with ecosystem destruction in the quest for development and expanded food

production to feed the teeming population in tropical Africa (Mfon *et al.* 2014).

Little is known about the population status of most medicinal plant species in west tropical Africa, although it is clear that most medicinal plants are collected from wild populations (Acharya and Acharya 2010). There is a great need to provide a framework for the conservation and sustainable use of medicinal plants and make the users (HMPs and HVs) to contribute financially to conservation projects. Sustainable practice of herbal medicine and availability of plant materials for new drug development are however hinged greatly on conservation of these plants. It is therefore necessary that systematic cultivation of medicinal plants be introduced in order to conserve biodiversity and protect threatened species. Uncontrolled disappearance of medicinal plants from their natural habitats due to destructive harvesting methods and overexploitation could result in a major setback for the continuous practice of herbal medicine in rural areas of developing countries. Implications of absence of conservation programmes directed at medicinal plants may speak doom for the poor populations that lack the financial muscle to access modern health care services, who rely almost exclusively on medicinal plants for several health care needs (Khan *et al.* 2015). Willingness and ability to pay is the foundation of the economic theory of value (Ajewole 2000). This means that if something is worth having, then it must be worth paying for. The main objectives of this study were to (i) assess the willingness of HMPs and HVs to pay for conservation with a view to establishing a sustainable way for medicinal plants conservation and development based on demand driven approach, (ii) inventory commonly used medicinal plants and their utilization in the study area, and (iii) assess perceived scarceness of the plants.



METHODOLOGY

The study Area

The study was carried out in Ibadan, the administrative capital of Oyo State which lies in the South-western part of Nigeria. It consists of eleven Local Government Areas (LGAs) of which five are located within the metropolis, while the remaining six extend to the rural relevance. Urbanised areas located within the metropolis are Ibadan North, Ibadan North-West, Ibadan North-East, Ibadan South-West, and Ibadan South-East LGAs. The city of Ibadan is located approximately on longitude $3^{\circ} 54^1$ East of the Greenwich Meridian and latitude $7^{\circ} 23^1$ North of the Equator with a total land area of 130 km^2 . It is 750m above sea level (asl) and characterised by two distinct seasons: the rainy season from March to October while the dry season spans from November to February. The people belong to the Yoruba folk who traditionally engage in peasant farming, which is however, the subsistence farming fast disappearing due to more rewarding city jobs provided by emerging industries and government institutions. There is abundance of artisans and petty traders in markets and centres across the metropolis servicing the professionals and expatriates. Within the metropolis, there are two special markets for herbal materials and other items for traditional medicine at Oje and Bode. In these markets, medicinal plants from rural areas across the country are sold in wholesale and retail on daily basis. In other open markets within the metropolis such as Bodija, Sango, Mokola, Oja-oba, Inalende, Beere and several others, special sections are created for medicinal plants which are sold mostly in dry form and sometimes fresh depending on usage mode.

Sampling Procedure and Data Collection

Primary data for this study were collected using structured questionnaires administered

on 140 HMPs randomly selected from fourteen associations under the aegis of Nigeria Traditional Medical Association (NANTMP), and 90 HVs from nine medicinal plants and ingredients markets in Ibadan metropolis. Out of two hundred and thirty (230) questionnaires administered, 207 were retrieved and analysed for this report. Information recorded in the survey include respondents' willingness to contribute financially for medicinal plants conservation, amount willing to contribute, motivating factors for the respondents' willingness to participate in conservation of medicinal plants, surveys of individuals having herbal garden and their mode of maintenance, medicinal plants available in private herbal gardens, suggested plants to be cultivated and respondent's demographic data. Inventory of commonly used medicinal plants with their utilization in the study area was also carried out. Perceived scarce and frequently used medicinal plants in the area were inquired with the aim of recommending appropriate conservation programmes for policy formulation. HMPs and HVs associations' selected included Irenitemi and Associates, Amalgamation of Nigerian Herbalists, Oyo State Traditional Medical Association, Native Medicine Practitioners Association, Egbogbemi Herbal Medicines Association, Sewedayepo Nigeria Herbalists, Irenitemi and Associates II, Holistic Life care Association, Ewedayepo African Medical Association, Ifedawapo Traditional Medical Herbalists, Nigeria Association of Medical herbalists, Oremeta Herbalists Association, The Association of Native Pharmacy of Nigeria and Nigeria Union of Medical Herbal Practitioners .

DATA ANALYSIS

The data extracted from the questionnaires were analysed with descriptive statistics, frequency distribution and charts.



RESULTS

Demographic factors of the respondents in the survey showed that males dominated (79%) the HMPs while females form the majority (69%) of HVs (Table1). Substantial

percentage (80%) of the HMPs and (84%) of the HVs were aged above 40 years. Few (20%) young adults aged below 30 years were involved in herbal medicine practice and marketing of medicinal plants.

Table 1: Demographic characters of herbal medicine practitioners and herb vendors in Ibadan metropolis, Nigeria

Demographic Character		HMPs Percent (Freq.)	HVs Percent (Freq.)
Sex	Male	79 (98)	17 (14)
	Female	21 (26)	83 (69)
	Total	100 (124)	100.00 (83)
Age	31-40	2 (25)	16 (13)
	41-50	32 (40)	48 (40)
	Above 50	48 (59)	36 (30)
	Total	100 (124)	100.00 (83)
Education	No formal education	8 (10)	4 (3)
	Primary	35 (43)	49 (41)
	Secondary	40 (50)	39 (32)
	Tertiary	17(21)	8 (7)
	Total	100.00 (124)	100.00 (83)
Years of Residence	Below 10	18 (22)	1 (1)
	11 - 20	16 (20)	11 (9)
	21 - 30	36 (44)	43 (36)
	Above 30	31 (38)	28 (23)
	No Response	-	17 (14)
	Total	100.00 (124)	100.00 (83)

Results showed that most (40%) of the HMPs received secondary education, followed by those with primary education (35%). Persons with higher education training were few in the practise of herbal medicine especially among the herb vendors/marketers.

All the HMPs interviewed were willing to pay for conservation of medicinal plants in their neighbourhood to ensure continued supply of raw materials required in their business (Figure 1).

Possible areas that HMPs and HVs in Ibadan metropolis are willing to participate in medicinal plants conservation are shown in Table 2. About 16% of HMPs and 15% of HVs were willing to contribute financially while the vast majority (84% HMPs and 85% HVs) of the respondents are willing to provide useful information such as indigenous knowledge to conservation projects. Some were willing to participate in associations and groups that can serve advisory and monitoring roles.

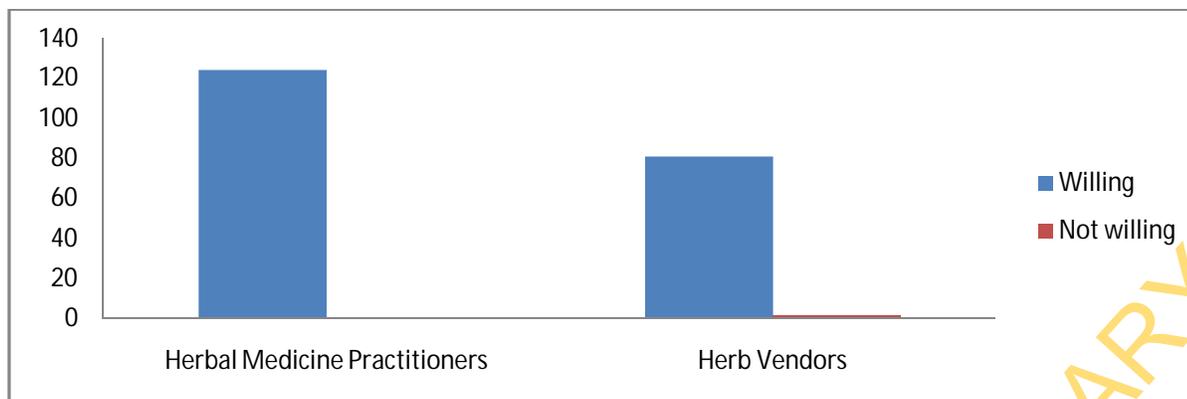


Figure 1: Willingness of herbal medicine practitioners and herb vendors to pay for conservation of medicinal plants in Ibadan, Nigeria

Figure 2 shows the amount of time the respondents were willing to set aside weekly to contribute to conservation of medicinal

plants. The HMPs were willing to contribute longer (8hours) time weekly than the HVs who are were willing to contribute 3hours.

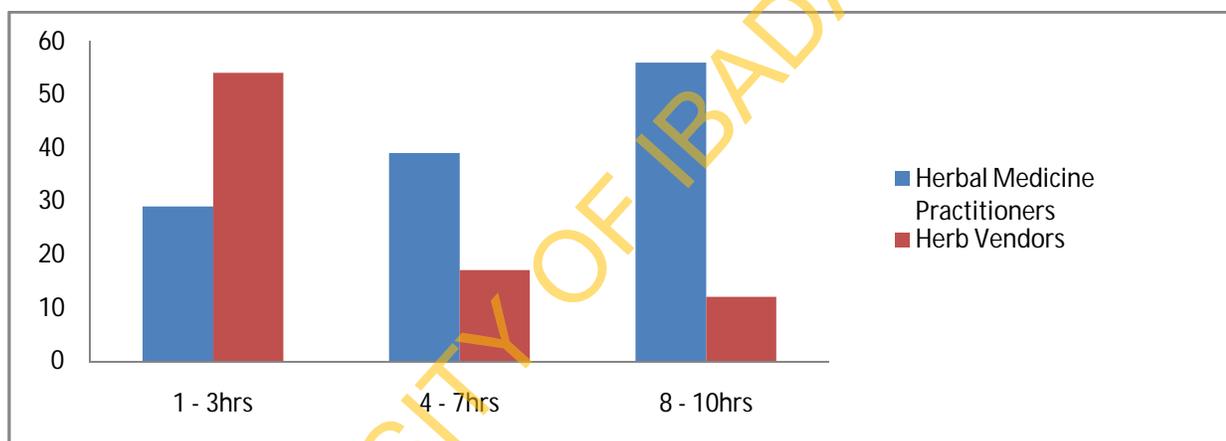


Figure2: Time HMPs and HVs are willing to contribute to conservation of medicinal plants projects in Ibadan Nigeria per week

Table 2: Areas HMPs and HVs are willing to participate in in medicinal plants conservation in Ibadan, Nigeria

Areas willing to Participate	HMPs % (Freq.)	HVs % (Freq.)
Support cultivation of herbs by giving information on medicinal plants conservation	47.60 (59)	63.90 (53)
Support cultivation of herbs by forming association/advisory committee	36.30 (45)	21.70 (18)
Supporting by giving financial contributions	16.10 (20)	14.5 (12)
Total	100.00 (124)	100.00 (83)



The average monthly income of HVs in Ibadan metropolis ranged from N2000 to about N150,000 (\$13.3 – 1000, USD \$1 = N150) depending on the scale of enterprise (Table 3). Some operated as wholesalers and

sell in bulk to retailers in the local herbal remedies recipes market. However, most of the HVs operated on a low to medium scale with average monthly income of less than N10,000.

Table 3: Medicinal plants sellers’ average monthly income in Ibadan Metropolis, Nigeria

Average Monthly income (N)	Percentages/ (Frequencies)
2000	2(1)
3000	2(1)
3500	3(2)
4000	3(2)
4200	2(1)
5000	17(10)
6000	2(1)
7000	10(6)
8000	9(5)
10000	24(14)
12000	5(3)
20000	3(2)
22000	2(1)
23000	2(1)
25000	3(2)
30000	2(1)
35000	2(1)
50000	2(1)
74000	2(1)
90000	2(1)
150000	2(1)

The respondent’s willingness to contribute financially was expressed in specific amounts willing to contribute yearly. The majority (55%) of the interviewed HMPs

were willing to contribute between N500 - N1500 annually, while most of the HVs (52%) were willing to contribute between N201 - N500 yearly.

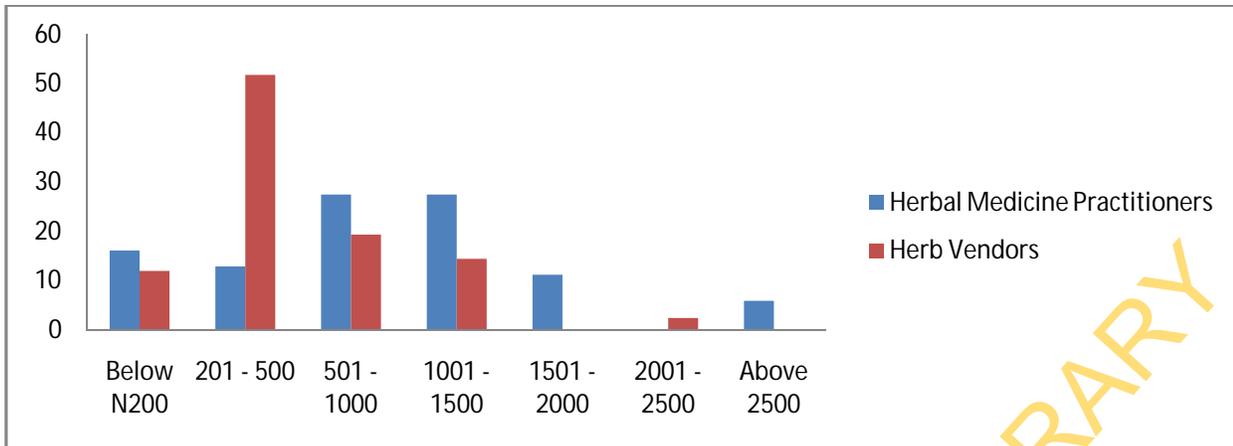


Figure 3: Amount of money (Naira) HMPs and HVs were willing to contribute annually for conservation of medicinal plants in Ibadan (USD \$1 = N150)

Improved human health (43%) was the main motive of HMPs to participate in medicinal plants conservation project in Ibadan (Figure 4), while accessibility (23%), availability (15%) and income generation

potential (20.2%) were the other motivation factors for medicinal plants conservation. However, HVs were motivated by availability (38%), income (32.5%) and improved human health (27.7%).

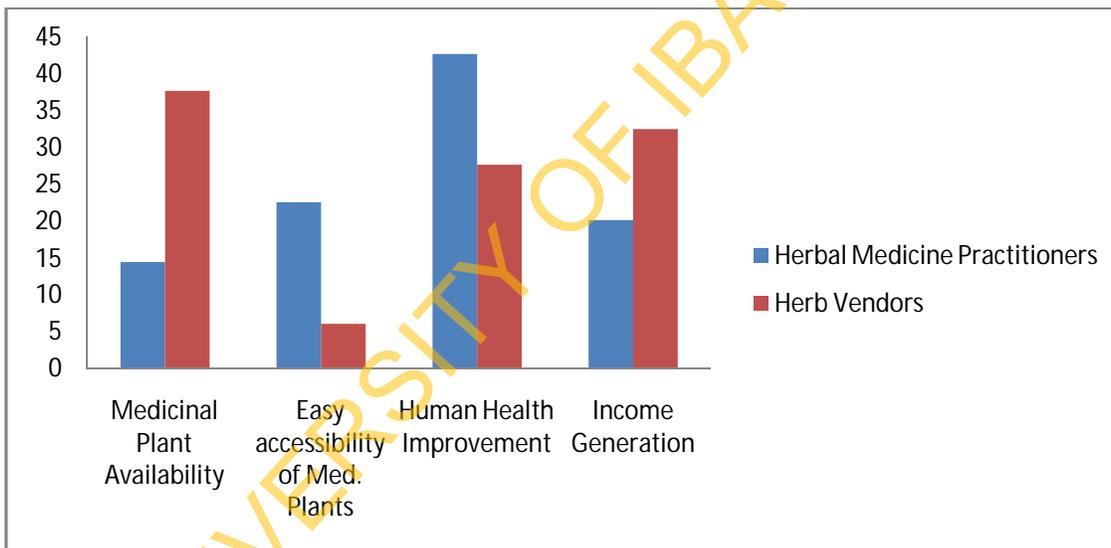


Fig. 4: Reasons for participating in conservation of medicinal plants by HMPs and HVs in Ibadan, Nigeria

Results showed that 72% of HMPs were aware of some private medicinal plant gardens existing in Ibadan metropolis while 92% of HVs were aware of the existence of such gardens in their neighbourhood (Figure

5a). However, about 36% of the HMPs and 17% of the HVs possessed their own medicinal plant gardens either on separate parcel of land or in their home premises (Figure 5b).

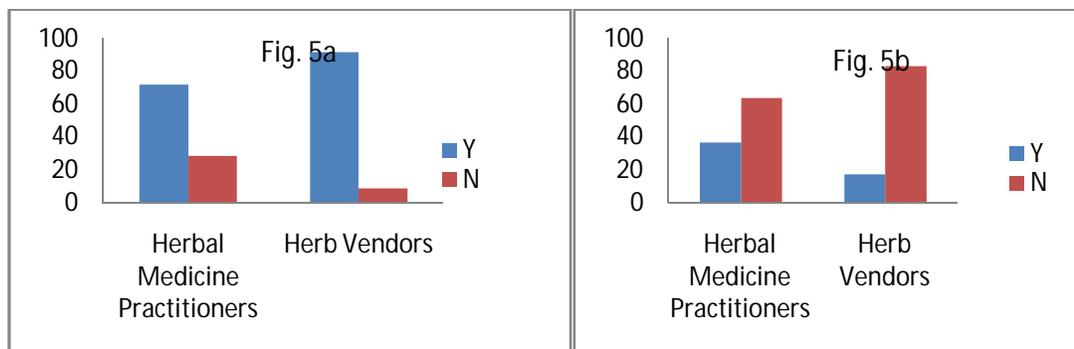


Figure 5a and b. Awareness of existing herbal garden and respondents holdings among HMPs and HVs in Ibadan Metropolis, Nigeria.

Respondents advanced reasons for not possessing private commercial herbal gardens as shown in Figure 6. Lack of fund

is largely (65%) responsible while land scarcity and high cost of acquisition were also indicated (31%).

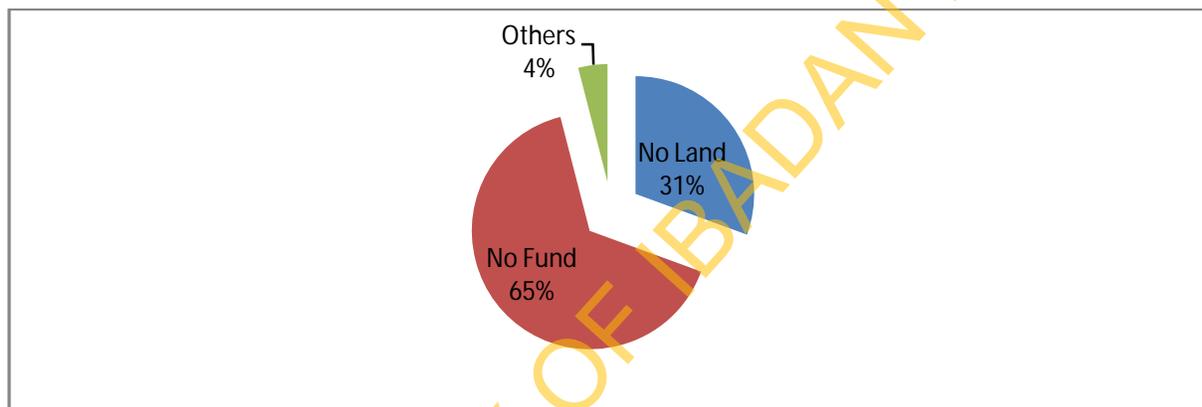


Figure 6. Reasons why HMPs and HVs do not have personal commercial herbal gardens in Ibadan, Nigeria

Survey of medicinal plants in HMPs premises and private gardens showed 38 plant species distributed into 28 families (Table 4). Euphorbiaceae family has the highest frequency with two genera (*Jatropha curcas*, *Euphorbia kamerunica*, *E. drupifera* and *E. poisonii*) while 21 plant species were suggested for immediate conservation intervention as result of their scarce conservation status (Table 5). Frequently used plants to treat prevalent diseases such as malaria, paediatrics and reproductive issues are mostly planted in the HMPs premises.

DISCUSSION

HMPs on many occasions collect herbal materials directly from the wild sources for proper identification of medicinal plants. Self-collection from long distances and difficult terrains could be strenuous hence physically fit males are usually involved as apprentices who graduate to become independent practitioners. In addition, professional herbalist is culturally regarded as male job among the Yoruba folk in southwest Nigeria and Bamboutos area of Cameroun (Areo 2014; Tsobou *et al.* 2016). Male dominance of the HMPs (Table 1) may



be associated to cultural beliefs and physical strength required during apprenticeship for digging tree roots and climbing which women rarely do. In contrast, studies in New Zealand showed that 91% of herbal medicine practitioners were females (Cottingham *et al.* 2015); this scenario could be viewed from differences in cultural heritages. However, local trade in medicinal plants in southwest Nigeria is traditionally reserved for women, findings in the survey showed that females constitute 83% of the HV. Distribution of HVs gender in this study agrees with reports by (Mustafa *et al.* 2014) in the neighbouring Osun State of Nigeria

There is low participation in herbal medicine practice of individuals who received tertiary education who preferred more financially rewarding and socially dignified careers as observed in the report of (Aiyeloja *et al.* 2012). There is therefore the need of encouraging the present educated generation to develop interest in herbal medicine practise for improved services and sustained affordable primary health care in developing societies of sub-Sahara west Africa.

More than 60% of the HMPs have lived in the study area for more than 20 years. The long years of residence of HMPs in the study area is an indication that both elites and poor population patronises and sustains the HMPs over the years, this also assist the practitioners to have better understanding of their society and gained more expertise on the treatment of prevalent ailments in the area.

Only three (3%) out of 81 HVs interviewed were not willing to contribute financially to medicinal plants conservation in the area. This indicates that both HMPs and HVs could support medicinal plants conservation if appropriate channels (conservation projects) and policies are in place. Dikgang and Muchapondwa (2012) also observed positive willingness to pay and support for medicinal plants conservation among the Khomani San rural community in South Africa. However, it is important that such projects are participatory of all stake holders including HMPs, HVs, Local Government authorities, conservation biologist and concerned agencies. Ariwaodo *et al.* (2013) also proposed establishment of medicinal plant gardens by traditional health practitioners in Osun State to reduce pressure on the natural forest ecosystem for conservation of medicinal plants genetic resources. Hence, there is the need to sensitize the HMPs and HVs on conservation needs by the stake holders.



Table 4: Inventory of medicinal plants in HMPs private herbal gardens

S/No	Species	Local Name	Plant parts used	Local Medicinal uses
1	<i>Anona senegalensis</i> Pers (Annonaceae)	Ewe Abo	Leaves	Stimulant, Pain reliever
2	<i>Anthocleista djalonensis</i> A. Chev (Loganiaceae)	Saposapo	Root and stem bark	Abdominal pain
3	<i>Ocimum gratissimum</i> Lin. (Lamiaceae)	Efinrin	Leaf oil	Anti infection, Wound healing, Pile, Blood clotting
4	<i>Cymbopogon citratus</i> Stapf (Poaceae)	Ewe tea	Leaves	Antimalarial
5	<i>Venonia amygdalina</i> Delile (Asteraceae)	Ewuro	Leaves and stem	Leaves cooked as vegetable, Decoction as antimalarial, antidiabetic, Pile and stem as chew stick for mouth infections
6	<i>Jatropha curcas</i> L. (Euphorbiaceae)	Lapalapa, Lobotuje, Iyalode	Stem juice	Treatment of skin rashes on children, Twigs chew as oral thrush
7	<i>Senna alata</i> (L.) Roxb. (Caesalpinaceae)	Asurin Oyinbo	Leaf juice	Skin infections and rashes, inflammation
8	<i>Morinda lucida</i> Benth (Rubiaceae)	Oruwo	Stem bark, roots and leaves	Malaria, Jaundice and Typhoid fever
9	<i>Bambusa vulgaris</i> Schrad. ex J.C. Wendl. (Poaceae)	Oparun	Leaves	Ulcer, Malaria and Typhoid fever
10	<i>Ageratum conyzoides</i> L. (Asteraceae)	Imiesu	Aerial parts	Leaf juice for fresh wound healing
11	<i>Parquetinani grescens</i> Afzel. (Asclepiadaceae)	Ogbo	Stem juice	Treat stooling and blood purification
12	<i>Momordica charantia</i> L. (Cucurbitaceae)	Ejinrinwewe	Leaves	Antimalarial, Pile (Haemorrhoid)
13	<i>Telfairia occidentalis</i> Hook. f (Cucurbitaceae)	Ugu	Leaves	Leaf juice as blood enrichment, cooked as vegetable
14	<i>Mangifera indica</i> L. (Anacardiaceae)	Mangoro	Leaves and stem bark	Decoction as antimalarial, treatment of Typhoid and yellow fever
15	<i>Annickiachlorantha</i> (Oliv.) Setten & Maas (Annonaceae)	Awopa, Osopa	Stem bark	Decoction used to treat malaria fever
16	<i>Pseudocedrelakotschy</i> (Schweinf.) Harms (Meliaceae)	Emi gbegiri	Stem bark	Piles, skin rashes and blood enrichment
17	<i>Monodora tenuifolia</i> Benth (Annonaceae)	Aworoso	Fruits/nuts	Powdered nuts as soup to flush the digestive system (stomach)
18	<i>Anogeisus leiocarpus</i> (DC.) Guill. & Perr (Combretaceae)	Ayin	Leaves and stem bark	Decoction enrich blood and treat haemorrhoid
19	<i>Mimosa pudica</i> L. (Mimosaceae)	Patanmo	Aerial parts	Decoction used to treat haemorrhoid
20	<i>Basellia alba</i> L. (Basellaceae)	Amunututu	Leaves	Blood purification and ulcer
21	<i>Psidium guajava</i> L. (Myrtaceae)	Gurofa	Leaves	Decoction for malaria
22	<i>Abrus canescens</i> Welw. Ex Bak. (Papilionaceae)	Ominsinmisingoro	Aerial parts	Sore throat



S/No	Species	Local Name	Plant parts used	Local Medicinal uses
23	<i>Heliotropium indicum</i> L. (Boraginaceae)	Ogbeoriakuko	Leaves	Rheumatism and body pains
24	<i>Euphorbia kamerunica</i> Pax (Euphorbiaceae)	Oro agogo	Stem juice	Skin infections and Diarrhoea
25	<i>Euphorbia drupifera</i> (Thonn.) Stapf (Euphorbiaceae)	Oro adete/Orogi	Stem juice	Stomach pains and antidiabetics
26	<i>Zingiber officinale</i> Roscoe (Zingiberaceae)	Atalefunfun	Rhizome	Gastrointestinal problems and as spice
27	<i>Euphorbia poisonii</i> Pax (Euphorbiaceae)	Enuopiri	Stem juice	Esoteric uses
28	<i>Rhus longipes</i> Engl. (1883) (Anacardiaceae)	Ewe orijin	Leaves	Esoteric uses
29	<i>Carica papaya</i> L. (Caricaceae)	Ibepe	Dry leaves	Decoction as antimalarial and reduction of high body temperature
30	<i>Harungana madagascariensis</i> Lam. ex Poir (Harungaceae)	Amuje	Stem bark	Antidiabetics and blood enrichment
31	<i>Cyathula prostrata</i> Blume (Amaranthaceae)	Sawerepepe	Whole plant	Spiritual sacrifice to appease gods
32	<i>Corchorus solitorius</i> L. (Tiliaceae)	Ewedu	Leaves	Blood enrichment and cooked as vegetable
33	<i>Plumbago zeylanica</i> L. (Plumbaginaceae)	Inabiri	Leaves	Asthma and Cough
34	<i>Artocarpus alttilis</i> (Parkinson) Fosberg (Moraceae)	Gberebutu	Fruits	Boiled fruits taken to aid digestion and alleviate stomach disorder
35	<i>Tapinanthus brunneus</i> (Engl.) Danser (Loranthaceae)	Afomoonisana	Leaves	Decoction stimulate mammary milk in nursing mothers
36	<i>Piper guineense</i> Schumach. & Thonn (Piperaceae)	Iyere	Leaves, fruits	Cooked for blood enrichment, dry fruit/berries as spice
37	<i>Abrus precatorius</i> L. (Papilionaceae)	Ojuologbo	Seeds	Respiration stimulant
38	<i>Securidaca longipedunculata</i> Fresen (Polygalaceae)	Ipeta	Roots	Cough treatment, Worm expeller



Table 5: Suggested medicinal plants for conservation projects in Ibadan metropolis

S/No	Species	Local name	Parts used	Uses	Conservation status
1	<i>Combretum zenkeri</i> Engl. & Diels (Combretaceae)	OganOgunrogo	Leaves	Blood purification and enrichment	Scarce
2	<i>Citrullus colocynthis</i> var. <i>lanatus</i> (Thunb.) Matsum. (Cucurbitaceae)	Egusibara	Unripe fruits	Detoxification of body system	Scarce
3	<i>Abrus precatorious</i> L. (Papilionaceae)	Ojuologbo	Seeds	Sore throat	Scarce
4	<i>Senna alata</i> L. (Caesalpinaceae)	Asuwonoyinbo	Leaves	Skin rashes, Inflammation	Scarce
5	<i>Parquetin anigrescens</i> Afzel. (Asclepiadaceae)	Ogbo	Stem Juice	Blood enrichment	Scarce
6	<i>Alstonia boonei</i> R.Br. (Apocynaceae)	Ahun	Leaves and stem bark	Malaria Typhoid treatment	Scarce
7	<i>Anogeisus leiocarpus</i> (DC.) Guill. & Perr (Combretaceae)	Ayin	Leaves and stem bark	Haemorrhoid	Scarce
8	<i>Picralima nitida</i> Pierre (Apocynaceae)	Abeere	Seeds	Cough and Haemorrhoid	Rare
9	<i>Morinda lucida</i> Benth (Rubiaceae)	Oruwo	Leaves and stem bark	Malaria	Scarce
10	<i>Basellia alba</i> L. (Basellaceae)	Amunututu	Leaves	Malaria	Rare
11	<i>Rhus longipes</i> Engl. (1883) (Anacardiaceae)	Orijin	Leaves	Reducing of body temperature	Threatened
12	<i>Annickia chlorantha</i> (Oliv.) Setten & Maas (Annonaceae)	Awopa	Stem bark	Malaria	Threatened
13	<i>Khaya grandifoliola</i> C. DC. (Meliaceae)	Oganwo	Stem bark	Malaria	Rare
14	<i>Allium sativum</i> L. (Alliaceae)	Alubosaelewe	Bulb		Scarce
15	<i>Pseudocedrelakotschyi</i> (Schweinfurth) Harms (Meliaceae)	Emigbegiri	Stem bark	Blood purifier and enrichment	Scarce
16	<i>Sesamum radiatum</i> Schumach. (Pedaliaceae)	Ekudan	Leaves	Heart disorder	Rare
17	<i>Waltheria indica</i> var. <i>americana</i> (L.) R. Br. ex Hosaka (Malvaceae)	Epakun	Roots	Liver problems	Threatened
18	<i>Kalanchoe crenata</i> (Andrews) Haw (Crassulaceae)	Odundun	Leaves	Skin rashes, Liver problems	Scarce
19	<i>Rauwolfia vomitoria</i> Afzel. (Apocynaceae)	Asofeyeje	Leaves and stem bark	Malaria and Typhoid fever, Mental disorder	Scarce
20	<i>Citrus aurantifolia</i> Swingle (Rutaceae)	Osanwewe	Fruits	Cough, Malaria and Typhoid fever, Cold, Oral thrush, Preservatives	Scarce
21	<i>Secamone afzelii</i> R.Br. Asclepiadaceae	Ailu	Leaves	Children skin rashes	Scarce



The time per week respondents were willing to contribute could be an index to measure their level of commitment in conservation projects. HMPs are directly involved in medicinal plants collection and procurements hence, scarcity of these plant resources could pose threat to their operation efficiency while the HVs depend only on plants available for marketing. HVs also sell other items besides plant materials that could keep them in business profitably in the event of scarcity of certain plants compared to HMPs. Readiness of HMPs to devote more time to conservation projects could be linked to the fact that most of them rely on herbalism for livelihood. It's obvious that the HMPs degree of willingness to support medicinal plants conservation in Ibadan metropolis is higher because such project will guarantee sustainable supply of raw materials for herbal preparations.

Unwillingness to support conservation projects financially is not unconnected with the country's low per capita income of \$3,203.3 as at year 2014, currently the poverty level in Nigeria is 46.0% (World Bank 2016), and these indices invariably incapacitate the HMPs and HVs to make financial commitment to conservation projects. Formulation and implementation of good policies is necessary to enhance respondents' income and consequently empower them to support conservation financially. However, few (6%) HMPs were willing to support with over N2500 annually (Figure 3). This suggests that the respondents were skeptical in investing their money in conservation of medicinal plants since several of such community projects were initiated and had been abandoned in the past due to lack of proper management. Hence, coordinating agencies needs be trusted to build confidence of participating individuals. An awareness programme to sensitize the respondents on the gains of

medicinal plants conservation in the area will therefore be appropriate by the Government or non-governmental agencies.

Conservation of medicinal plants in Ibadan metropolis has the potential to impact the local economy positively through employment opportunities for the teeming population. Areo (2014) noted that several skilled and unskilled individuals were involved in the production and marketing of medicinal plants. Employment and income potentials have been observed in places where these important plants are conserved through cultivation (Hamilton 2004). It can be deduced that availability of herbal materials and steady income could ensure continuous stay of HVs in business, hence majority were motivated by such factors.

ITA and Offiong (2013) noted that HMPs in Nigeria usually propagate commonly used plants in their premises. Large percentage (92%) of the respondents are aware of private herbal gardens (Figure. 5a), it would therefore be easier to convince them to participate in such conservation projects especially for plants used for prevalent diseases such as malarial and paediatrics ailments. This will guarantee abundant and sustainably supply of correctly identified medicinal plants, as noted in Zimbabwe (Ngarivhume *et al.* 2015) provide employment, alleviate poverty and sustain livelihood. Nwachukwu *et al.* (2010) and Oladele *et al.* (2011) recommended establishment of medicinal plants gardens for sustainable supply of herbal materials as a result of the essential role traditional medicine plays in health care delivery in developing tropical nations.

Respondents advanced economic reasons for not possessing private gardens. HMPs and HVs are relatively poor and some HMPs often offer services as humanitarian in their



communities while HVs mostly operated at subsistence level as petty traders with start-up capital accumulated from personal savings. Nigeria is a developing country with low per capital income of \$3,203.3 USD where 70% of the population live below poverty line of \$2USD per day as at year 2010 (CIA 2016).

CONCLUSIONS RECOMMENDATIONS

Results from this work showed that HMPs and HVs are willing to contribute financially to conservation of local medicinal plants projects. However, it should be noted that most of them have financial limitations due to high poverty level. Most private gardens owned by HMPs and HVs are small pockets around their premises, indicating the need for land acquisition by corporate bodies for conservation purposes. Small pockets of medicinal plants gardens have restricted species composition and population. Large scale ex-situ conservation and cultivation is undoubtedly a panacea for scarcity and extinction of useful medicinal species in the study area. Financial empowerment and land acquisition can be achieved by organising the HMPs and HVs into formidable cooperative societies with a major aim of sustainable herbal stocks supply through cultivation. Findings in this work also suggested important local medicinal plants requiring urgent conservation measures due to their roles in the management of prevalent ailments. Conservation of medicinal plants in special projects has the capacity to boost the health for all World Health Organisation project since it will be targeted at sustainable use and conservation of properly identified medicinal plant materials. Concerned agencies such as NGOs, Herbal Practitioners Societies and Government need to launch awareness campaign on the importance of medicinal plants conservation

in the health care delivery in poverty ridden economies. Appropriate policy formulation and implementation will encourage private participation in conservation of scarce and endangered local medicinal plants.

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