

Conservation Status and Use of Medicinal Plants by Traditional Medical Practitioners in Machakos District, Kenya

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From time immemorial, plants have been an indispensable source of both preventive and curative medicinal preparations for human beings. More than 90% of the Kenyan population use medicinal plants at one time or another as their primary source of healthcare. In the rural areas and among the urban poor, herbal medicine is in most cases the only form of health care, and sick persons only consult regular physicians as a last resort. During the study, 74 Traditional Medical Practitioners (TMPs) were interviewed; 141 plant species in 124 genera and 44 families were found to be used at one time or another in treatment of various diseases. Consensus as a quantitative criterion was used in recording field information. Descriptive statistics was used in data analysis. Population reduction (PR) criterion was used to determine priority species in need of urgent conservation. Based on this, fourteen plant species were found to have become rare due to over exploitation.



Daniel Kisangau (center).

Introduction

The World Health Organization (WHO) estimates that up to 80% of the world's population, mostly in developing countries, relies on traditional medicine practices for its health care needs. This is particularly true of the poorer sections of the population in developing countries because natural remedies are not only cheaper than modern medicines, but are often the only medicines available in remote rural regions (GTZ 2001). In Africa, in particular, traditional medicine has always existed and has been practiced since time immemorial (Hirt & M'Pia 1995). Plants have been an indispensable source of both preventive and curative medicinal preparations for human beings (Dery et al. 1999). Besides serving medical and cultural functions, medicinal plants in Africa and other developing countries frequently provide economically disadvantaged groups such as small holders and landless people with their only form of cash income (GTZ 2001). Medicinal plants are also important sources of therapeutic agents in the industrial production of pharmaceuticals (Lambert et al., 1997).

In Kenya, traditional medicine continues to play a major role in Primary Health Care (PHC). More than 70% of the Kenyan population relies on traditional medicine as its primary source of health care, while more than 90% use medicinal plants at one time or another (Odera 1997). It is more accessible than modern health facilities for most of the population in the country. It is relatively inexpensive, locally available, and usually accepted by the local communities as comparable to modern conventional medicine.

The substantial contribution to human health and well being made by medicinal plant species is now widely appreciated and understood. Indeed, there is a growing demand for

many of the species and an increasing interest in their use. This, combined with continued habitat loss and erosion of traditional knowledge, is endangering many important medicinal plant species and populations and creating an urgent need for improved methods of conservation and sustainable use of these vital plant resources (Leaman et al. 1999). Unmonitored trade of medicinal plant resources, destructive harvesting techniques, over-exploitation, habitat loss, and habitat change are the primary threats to medicinal plant resources in most developing countries (IUCN 2001, 2002).

Most of the plants used in traditional medicine are collected from the wild, and only a few have been domesticated. There is, therefore, a real danger of genetic erosion, which in turn calls for the need for collection and conservation, research on propagation and cultivation, and investigation into possible modifications in the active ingredients due to changes in the growing environment. For conservation of rare plant species, cultivation is often considered an alternative to wild collection (IUCN 2001).

Study Objectives

- To conduct ethnobotanical surveys of medicinal plant biodiversity used by traditional medical practitioners in Machakos District.
- To inventory and prioritize medicinal plants in need of urgent conservation.
- To collect herbarium voucher specimens of the medicinal plants.

Area of Study

Machakos district is one of the thirteen districts that form the Eastern Province in Kenya. It lies between latitudes 0° 45' south to 1° 31' south and longitudes 36° 45' east to 37° 45' east. The district covers an area of 6,281.4 kms², most of which is semi-arid. It is divided into 12 divisions, 62 locations, and 225 sub-locations. Average annual rainfall ranges from 500–1,300 mm with the high altitudes receiving more rain than low-lying areas. The rainfall is very unreliable and varies from year to year making it difficult for farmers to plan their farming activities, thus affecting both livestock and agricultural production. The mean monthly temperatures range from 12°C in the coldest months to 25°C in the hottest months. The district population stands at 906,644, but the distribution of health facilities is not even as most of them are concentrated in main town centers. This forces the population in the rural areas to travel for long distances in search of medical services. The doctor/population ratio is 1:62,325, indicating a lack of health personnel (GoK 2003–2008).

Materials and Methods

The study was carried out between July–October 2002 in eight of the twelve divisions in the district. Open-ended, semi-structured questionnaires were used in gathering information on harvesting methods, preparation, and administration of herbal remedies, along with other field information on herbal practice. Local administrators (chiefs and assistant chiefs) and health workers were used as guides in tracing the respondents. Authentic informants were interviewed randomly but independently from home to home during pre-arranged appointments. Focus Group Discussions (FGDs) were held at chief camps where the respondents were permitted to air their views freely, especially in the areas of challenges facing their herbal practice and plant conservation issues. This information was captured by use of a

portable tape recorder. Field excursions were carried out with the help of authentic traditional herbalists. Plant materials were collected and voucher specimens deposited at the East African herbarium. Information resulting from personal observation also was recorded. Through the help of the local administrators, herbal practitioners in different administrative locations were mobilized to form conservation groups.

Results

Ethnomedicine:

A total of 74 informants were interviewed during the study, and 141 plant species in 124 genera and 44 families were of determined to be ethnomedical value. The ethnomedicinal uses of the first twenty plant species are illustrated below.

<u>Botanical Name</u>	<u>Kamba Name</u>	<u>Ailment(s)</u>	<u>Processing</u>	<u>Dosage</u>
<i>Acacia nilotica</i>	Musemei	Gonorrhoea, chest pain cough	Bark boiled and mixed with soup or honey	1 glass 3x day for 1 week
<i>Acmella calirhiza</i>	Kamutata	(1) Oral thrush (2) Ulcers	(1) Leaves chewed (2) Infusion made	(1) As needed (2) 1 glass 3x day for 4 days
<i>Albizia anthelmintica</i>	Kyowa	Intestinal worms	Bark boiled	1 glass/day for 3 days
<i>Aloe secundiflora</i>	Kiluma	Malaria, diarrhoea, typhoid, edema	Leaves soaked in water	1 glass infusion 2x day for 3 days
<i>Barleria eranthemoides</i>	Thangila	Dyspepsia	Whole plant burned	Pinch 3x day
<i>Carissa edulis</i>	Mukawa	Nose bleeding, diarrhoea, typhoid fever	Roots boiled	1 glass 3x day
<i>Erythrina abyssinica</i>	Kivuti	(1) Cancerous wound (2) Stomach pain	(1) Root burned (2) Root infusion mixed with burned hen's feathers	(1) Charcoal powder applied to wound 1 glass 3x day
<i>Fagaropsis hildebrandtii</i>	Muvindavindi	Morning sickness, women's infertility, malaria, asthma, ulcers	Root or bark soaked in water or boiled	Infusion or decoction 1 glass 3x day
<i>Fuerstia africana</i>	Kalaku	Malaria, pneumonia, ulcers, infertility	Leaves pounded and soaked in warm water	1 glass 3x day
<i>Harrisonia abyssinica</i>	Mukiliulu	Stomach pain	Roots pounded and soaked in water	½ glass 2x day for 2 days
<i>Hydnora abyssinica</i>	Kimela	Diarrhoea, amoebic dysentery	Stem dried and pounded	1 glass 2x day for 2 days
<i>Kleinia squarrosa</i>	Mun'endyanthenge	Asthma, amenorrhoea, syphilis, jaundice, malaria	Stem boiled or pounded and soaked in water	1 glass decoction or infusion 3x day for 1 week
<i>Lannea schweinfurthii</i>	Kyuasi	Malaria	Root pounded and soaked in water	½ cap 3x day for 1 month
<i>Lippia javanica</i>	Kyulu	Colds	Leaves boiled	½ glass 3x day
<i>Ocimum basilicum</i> Mutaa	(1) Headache	(1) Headache	(1) Leaves pounded and soaked in water	(1) Put in ear
<i>Pappea capensis</i>	Kiva	(2) Morning sickness Typhoid fever, amoebic dysentery, abdominal pain	(2) Whole plant boiled Roots boiled	(2) 1 glass 2x day 1 glass decoction 3x day

<i>Plectranthus cylindraceus</i>	Kio	(1) Morning sickness (2) General body weakness, peptic ulcers	(1) Stem boiled (2) Stem crushed and soaked in water	Both: 1 glass 3x day for 2 weeks
<i>Strychnos henningsii</i>	Muteta	Malaria, body/joint pain, epilepsy, diabetes	Leaves or bark boiled	1 glass 3x day for 1 week
<i>Zanha africana</i>	Mukolekya	Prevent miscarriage (bleeding), typhoid fever	Dry root pounded and ½ teaspoon put in cold water	1 glass 3x day for ½ month
<i>Zanthoxylum chalybeum</i>	Mukenea	Pain in fallopian tubes, asthma, pneumonia, malaria, ulcers	Root or bark pounded and soaked in water or boiled	1 glass 2x day

Conservation and sustainable use of medicinal plants:

The study identified some medicinal plants that can be classified as having become rare or threatened due to over-exploitation. The most important factors found to contribute to over-exploitation and denudation of medicinal plant resources were:

- poor harvesting methods
- clearance for cultivation
- fire wood collection
- drought

This decline was confirmed by the fact that the herbal practitioners now move for long distances to collect the same kind of plants they used to collect within the vicinity of their homesteads only few years ago. Some of the most destructive methods employed by the practitioners while harvesting medicinal plants were:

- total debarking
- uprooting of whole plants
- whole cut

Fourteen plant species were found to have become rare mainly due to over-exploitation for medicinal purposes:

<u>Botanical Name</u>	<u>Kamba Name</u>	<u>Ailment(s)</u>
<i>Acacia nilotica</i>	Musemei	Gonorrhoea, chest ache, cough
<i>Carissa edulis</i>	Mukawa	Nose bleeds, diarrhea, typhoid fever
<i>Dalbergia melanoxylon</i>	Muingo	Cough, stomach pain
<i>Fagaropsis hildebrandtii</i>	Muvindavindi	Morning sickness, infertility, watery discharge, malaria, asthma, ulcers, pneumonia, epilepsy, internal abscess, prevent miscarriage
<i>Harrisonia abyssinica</i>	Mukiliulu	Stomach pain
<i>Plectranthus cylindraceus</i>	Kio	Morning sickness, general body weakness, peptic ulcers, stomach pain
<i>Salvadora persica</i>	Mukayau	Edema, malaria
<i>Securidaca longipedunculata</i>	Muuka	Gonorrhoea, malaria, stomach pain, insanity
<i>Steganotaenia araliacea</i>	Muvuavui	Malaria, edema
<i>Strychnos henningsii</i>	Muteta	Malaria, epilepsy, diabetes, body/joint pain
<i>Uvaria scheffleri</i>	Mukukuma	Chest pain, stomach pain

<i>Ximenia americana</i>	Mutula	Severe headache, malaria, epilepsy
<i>Zanha africana</i>	Mukolekya	Scabies, prevent miscarriage (bleeding), nose bleeding, diarrhea, typhoid fever, pneumonia
<i>Zanthoxylum chalybeum</i>	Mukenea	Pain in fallopian tubes, stomach pain, ulcers, diabetes, epilepsy, pneumonia, asthma, malaria, prevent miscarriage, after delivery bleeding

Cultivation:

It was noted that a number of the herbal practitioners in the area cultivated some medicinal plants around their homesteads in an effort to ensure replenishment, availability, and proximity of those species that have become rare and require traveling a distance to collect. While some species were found to do well when cultivated, others, particularly hardwoods, did not flourish at all due to:

- habitat restriction
- germination difficulty
- very slow growth
- unavailability of propagules (propagation units)

These four factors posed the greatest challenges to the practitioners, even when they sincerely desired to cultivate the plants. In some other cases, practitioners argued that it was an abomination to artificially cultivate any naturally growing plant, as this was equivalent inviting diseases into the family. This kind of belief automatically barred them from cultivating the plants, even when these were species that could readily be grown. Some of the medicinal plants cultivated in home gardens or herbal practitioners are listed below:

<u>Botanical Name</u>	<u>Kamba Name</u>	<u>Ailment(s)</u>
<i>Acmella calirhiza</i>	Kamutata	Oral thrush, ulcers
<i>Aloe secundiflora</i>	Kiluma	Swollen diaphragm, malaria, edema, nose bleeding, diarrhea, typhoid fever
<i>Kleinia squarrosa</i>	Mung'endya nthenge	Asthma, syphilis, edema, jaundice, stomach pain, malaria, amenorrhea
<i>Lippia javanica</i>	Kyulu	Colds
<i>Ocimum basilicum</i>	Yenye/Mutaa	Abdominal pain, headache, morning sickness
<i>Ocimum gratissimum</i>	Mukandu	Miscarriage, colds
<i>Plectranthus barbatus</i>	Muvou	Stomach pain, diarrhea
<i>Plectranthus cylindraceus</i>	Kio	Morning sickness, general body weakness, peptic ulcers, stomach pain
<i>Plumbago zeylanica</i>	Mukya	Chest pain, tuberculosis, hypertension
<i>Ricinus communis</i>	Mwaiki	Retained placenta, gonorrhoea
<i>Sesamum calycinum</i>	Luta	Dyspepsia, headache, dizziness
<i>Solanum nigrum</i>	Kitulu	Hastening delivery

Use of plant parts:

Of all the medicinal plants used in herbal practices, roots were the most utilized plant parts (38%). They were followed by leaves (29%), stem/bark (26%), other parts like fruits or seeds, and the whole plant, in that order. The percentage of “other parts” and “whole plant” each amounted to less than 5%.

Discussion

A socio-demographic and socio-economic analysis of the respondents showed that most of the practicing and authentic TMPs are between 50-80 years of age or even older. The majority of them have not had any access to formal education. Many are peasant farmers and spent a lot of their time offering health services to the community at very minimal charges. This, combined with their own average family size of 6–10 persons to feed, means that most of the practitioners remain poor.

It is unfortunate that most of the aged TMPs do not pass on their herbal knowledge to their children, young relatives, or friends. Many of the younger generation have moved to urban areas to work or to look for jobs. Moreover, they are not informed about the importance of traditional herbal knowledge, and therefore despise it and treat it as primitive and incompatible with the contemporary society. Consequently, the older generation, which harbors this wealth of the knowledge, is degenerating and dying without passing on this invaluable legacy.

Our greatest challenge, however, was the problem of how to address the issue of resource benefit sharing with the community members. Many respondents claimed that researchers were only interested in tapping their knowledge on medicinal plants and then never come back or provided any gain in return, so the community remains with a feeling of having been exploited. Further, there is no law in Kenya that governs or regulates the work of TMPs, thus no specific functions have been officially assigned to them. Most of TMPs practice as part-time herbalists outside the law, thus making their practice restrictive.

Since traditional medicine is not yet regulated in Kenya, many of the locally renowned TMPs have remained unrecognized. This, in large part, has contributed to intimidation by their counterparts in the conventional healthcare system, as well as to the low payments offered to them by the local community, which they, as well as conventional healthcare personnel, serve with honesty and effectiveness.

A major concern is the fact that barks and roots were harvested from most of the plant species, which indicates that the impact on the survival of most of these species may be overwhelming. This is magnified by the commercial transactions of medicinal plant parts by market vendors. Consequently, many species are now highly threatened, and this calls for urgent conservation measures. If the current, uncontrolled collection of medicinal plants is not regulated, many species will soon irreversibly disappear from the wild.

Conclusion

The mobilization of the community to form conservation groups undertaken during the study was a positive effort towards implementation of the research results and

recommendations. In many cases, there has been minimal or no followup at all of the field data. A lot of important data has ended up sitting on individuals' or institutions' desks without measures being undertaken to implement it. In the current study, on-farm cultivation trials of identified priority species have already been started by some groups, with an aim of replenishing the diminishing medicinal plant resources. This is one of the most viable ways to ensure availability and sustainability of such resources.

Recommendations

Demand for medicinal plants is increasing at such a rate that the natural stocks in the world are being destroyed. Hundreds of species are over-harvested, and face extinction if they are not protected or cultivated. Furthermore, there has been little coordination on the conservation of medicinal plants between the government agencies, organizations dealing with environment, and the rural community. There is, therefore, an urgent need to establish an integrated system among the stakeholders involved in traditional medicine research. This will ensure proper co-ordination in the management and sustainable utilization of medicinal plant resources.

It is important to identify priority medicinal plants for conservation, especially those that make a direct contribution to human livelihoods and human or animal health. After identifying the key species, appropriate agronomic techniques should be adopted that will ensure cultivation, integration into farming systems, and hence availability of these important resources within the proximity of the local people.

As a country, we can tap and implement the experiences of China and India, which are, so far, the world's greatest users of medicinal plants. Their experiences can be used to promote medicinal plant conservation, cultivation, community participation, and sustainable development.

Awareness campaigns on the importance of cultivating medicinal plants should be carried out to grass root levels, to eliminate the cultural beliefs that bar people from cultivating the plants. For example, the belief that "Cultivating medicinal plants is equivalent to inviting diseases into the family."

A policy should be enacted that would empower traditional herbalists to practice without restriction or fear of intimidation from their counterparts in conventional medicine.

Further pharmacological studies should be carried out on the most likely prospective medicinal plants used in herbal practice so as to establish their bioactivity potentials and possible development as drugs to deal with human and livestock health complications.

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