

## **A REVIEW OF TRADITIONAL KNOWLEDGE, USAGE AND STATUS OF THE MEDICINAL TREES AMONGST THE TUGENS OF ELDAMA RAVINE AND ESAGERI DIVISIONS, KOIBATEK COUNTY, KENYA.**

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### **Abstract**

Herbal therapy medicine uses plant extracts for their therapeutical value. It is the oldest form of healthcare known to mankind and remains an important element of human and livestock healthcare systems in many developing and industrialized countries. The Tugen ethnic group of Koibatek county and herbalists are well conversant and knowledgeable of the art of herbal medicine, and make good use of it. Despite its usefulness, the herbal therapy medicine is under threat from loss of medicinal plants and the disappearance of the art. The aim of the study was therefore to document the people's knowledge of the indigenous herbal medicine, their use, and examine the threats facing the trees and the disappearance of the art. A sociological survey was carried out in two Divisions of Koibatek county, and the collected data was analyzed using the Statistical Package for the Social Science (SPSS) version 11.5. The study revealed that herbal medicinal plants play an important part in the health care of the Tugen community, in Koibatek county, and that the local people are very knowledgeable on the herbal medicinal innovation, and make significant use of it. Unfortunately, the art is under threat from various causes, including slow and inadequate transfer of the art from the elderly herbalists to the younger generations. It is important to facilitate the protection and preservation of the traditional knowledge that might assist in discovery of modern medicine. Creation of legislations to regulate the harvesting of medicinal resources and create gene banks, will be useful.

**Keywords:** Key words: Medicinal trees, herbalists, indigenous herbal knowledge and art, usage status,

threats

## 1. INTRODUCTION

Herbal therapy medicine uses plant extracts for their therapeutical value. It is the oldest form of healthcare known to mankind (Girma, 2005, Manzoor and Maksuda, 2000) and remains an important element of human and livestock healthcare systems in many developing countries (Lambert, *et al.*, 2005). Presently about 4 billion people (approximately 60 - 80 %) of the world population and 90 % in Africa use herbal medicine for their primary health care (Ramzi *et al.*, 2008, Musyimi *et al.*, 2008, Parekh *et al.*, 2006, Hostettmann *et al.*, 2000, Hamann, 1991). In, Kenya, for example, of the 10,000 flora of Kenya, at least 1,200 have been recorded to have ethno-medicinal application by the forty-two (42) ethnic groups (Ogweno *et al.*, 2002). The Tugens of Koibatek county are no exception.

Industrialized countries also use medicinal plants, as many pharmaceuticals are based on or derived from plants compounds. This has resulted in herbal medicine taking a vital part in the health care system that is characterized by mushrooming of herbal medicine operators. Similarly, local and international trade in herbal medicine has grown into a multi-billion dollar industry. This has resulted in a shift in local harvesting patterns, from the sustainable approach to more commercial gathering approach (Gerald, 1997), resulting in loss of many medicinal tree species.

### 1.1 THE STUDY PROBLEM AND OBJECTIVES

Besides the numerous losses of the medicinal tree species through the selfish and damaging commercial harvesting approaches, lack of or inefficient means of transferring the traditional herb medicinal innovations from the elderly herbalists to the younger generations is also a significant way of the loss of the art. This is not to mention other many threats facing the trees in their natural environment, threatening their survival and sustenance.

The aim of the study was therefore to document the people's knowledge of the indigenous herbal medicine, their use and status of the medicinal trees, and examine the threats facing the trees, in the case of the Tugen ethnic group of Koibatek county.

Specifically, the following objectives were addressed:

- A review of the vast community Indigenous knowledge on medicinal tree species and their uses, including a review of the plant parts used for medicinal purposes,

the methods of preparation, administration and dosage, and the sources of herbal medicines

- Transfer of indigenous herbal medicinal knowledge to the younger generations
- Threats to medicinal plants in natural environment

### 1.2 Data Collection

The data was collected in Koibatek County, Kenya (Note 1). The study was a sociological inquiry that included both qualitative and quantitative approaches to gather data. Quantitative approach involved use of a questionnaire with both open and closed ended questions based on research objectives while qualitative approach involved gathering information from a Focus Group Discussion and Key Informants interviews. The sample area was stratified into two strata and one hundred respondents from each stratum were selected at random for interview in consideration of age, socio-economic status and sex. The respondent were explained the purpose of the study and assured that the interview was for research only. Key informants were made of ten herbalists selected on the basis of the duration they had practiced herbal medicine and their influence in the community. The selected herbalists were asked for their consent to share their knowledge only for the purpose of this study. One group discussion that comprised residents other than those interviewed and institutional leaders was conducted in each division. Direct observations were also made.

### 1.3 Data Analysis

Data was organized and edited to remove outliers. The responses to each question were coded and processed using Statistical Package for the Social Science (SPSS) version 11.5. Descriptive analysis was used to show summary and distribution of the data.

## 2.0 RESULTS AND DISCUSSION

### 2.1. The vast community Indigenous knowledge on medicinal tree species and their uses

The study indicated that the local people are very knowledgeable on medicinal tree species as they were able to identify them and their respective uses. The vast knowledge on the use of the plants included the people's perception of the different ailments that are treated by the tree species. For instance, as listed in Table 1 below, the people, along with their herbalists' colleagues, have revealed the various tree parts that are used to extract the medicines, their preparation methods, their administration, and the various ailments

treated by the medicines. They are familiar with some twenty six (26) different types of ailments that are treated by the local medicinal tree species, with ten of these being commonly reported in the area (MOH, 2007).

**Table 1: The trees, part used and their use**

Botanical name	Part used	Preparation method	Administration	Ailments treated
<i>Myrica salicifolia</i>	Bark, roots	Sun dried and ground into powder.	Sniffed or put in tea and taken as infusion	Chest congestion, Pneumonia, Diarrhoea, Nervous disorders Hypertension, Respiratory diseases
<i>Faurea saligna</i>	Bark, roots	Boiled for 15 -20 minutes	Taken as concoction with other species	Headache, Heart diseases, liver
<i>Toddalia asiatica</i>	Roots, Bark	Boiled for 20 minutes	Taken as concoction with other species	Blood pressure, Sexually transmitted diseases, Pneumonia
<i>Pittosporum vilidiflorum</i>	Bark, roots Ripe seed	Boiled for 15-20 minutes or chewed raw	Taken as concoction or chewed	Cough, Asthma, Potency enhancement
<i>Pillistigma thonginii</i>	Bark Roots	Boiled for 30 minutes in water	Taken as concoction with other tree species	Abdominal problems, Hypertension, Malaria
<i>Ravolfia cafra</i>	Bark, roots	Boiled for 20 minutes	Taken as concoction with other tree species	Abdominal problems, Infertility, Pregnancy related complications
<i>Haploculum folioloum</i>	Leaves	Boiled for 30 minutes or soaked for 24 hours	Taken as concoction with other tree species	Skin diseases, Diarrhoea, Gum infections, measles
<i>Mimusops kummel</i>	Bark, roots	Boiled for 20 minutes	Taken as concoction	Typoid, ulcers, cancer
<i>Albizia anthelmintica</i>	Bark, roots	Boiled for 15 minutes or soaked over night	Taken as concoction, infusion.	Malaria, Fever, Family planning, Dewormer

On the other hand, the local herbalists have listed forty seven (47) trees species from 30 botanical families that are used to treat various ailments. The selected species for this study were based on the herbalists' list that ranked the species based on the frequency of use, which coincidentally corresponded with the species' difficulty in propagation. Table 2 lists nine (9) of the species.

**Table 2: Species ranking based on the frequency of use.**

Local name	Botanical name	Family	Total score	Rank
Kabunybunyit	<i>Myrica salicifolia</i>	Myricaceae	100	1
Mosomboriet	<i>Faurea saligna</i>	Proteceae	96	2
Maite/Lolowe	<i>Mimusops kummel</i>	Sapotaceae	94	3
Nerwe	<i>Pittosporum vilidiflorum</i>	Pittosporaceae	93	4
Ketemwe	<i>Toddalia asiatica</i>	Rutaceae	92	5
Barmukute	<i>Albizia anthelmintica</i>	Mimosaceae	89	6
Motontonwe	<i>Ravolfia cafra</i>	Apocynaceae	86	7
Kipsoksokwe	<i>Pillistigma thonginii</i>	Caesapinadecea	85	8
Kokone	<i>Haploculum folioloum</i>	Sapindaceae	77	9

**Key:** Scores indicate ranks based on frequency of use and difficult in tree propagation.

Medicinal use of some of these plants has been recorded from other areas. For example, *F. saligna* and *T. asiatica* bark extracts are used for medicinal purposes among the Paliyar Tribe of South India (Veeramuthu *et al.*, 2006).

## 2.2.Plant parts used for medicinal purposes

Results from the surveys indicated that several plant parts are used for medicinal purposes. The study shows that the most frequently used plant parts are the barks (57 %), followed by roots (24 %), leaves (13 %), fruit/seeds (5 %) and others (2 %), as listed in Table 3 below.

**Table 3: Frequency of use of plants parts for medicinal purposes**

Plant parts	% of respondents
Bark	57
Roots	24
Leaves	13
Seeds/Fruits	5
Others	2

Other studies have reported higher use of roots (Bussmann, 2006) and leaves (Nanyingi *et al.*, 2008; Yineger *et al.*, 2008). Ironically, heavy harvesting of barks and roots, which are essential plant organs for survival, have been reported to negatively impact on species sustainability (Liu *et al.*, 2009; Lukelel *et al.*, 2008).

### 2.3. Methods of preparation

According to this study, the various plant parts used for medicine were mostly processed in their fresh form, while some were used dried. Other studies report that the plant parts were mostly crushed, squeezed, or powdered in their preparation, while other preparations reported include pills, adhesive plasters, decoctions, medicinal wines and medicinal butters (Liu *et al.*, 2009).

Respondents of this study suggested various methods of preparation, including boiling in water of fresh or dried parts, soaked of fresh plants in water, air drying and powdering, and eating fruits and/or seeds, eaten raw or cooked, as indicated in Table 4.

**Table 4: Methods of preparation of traditional medicine**

Preparation	% of respondents
Fresh or dried parts boiled in water	57
Soaked fresh in water	34
Air dried and powdered	43
Fruits/Seeds- eaten raw or cooked	18

Traditional medical practitioners in Nigeria are known to use a variety of herbal preparations in their practice (Sofowora, 1993), with the forests being the main locations where fresh plant material are collected from. Here, commonly one single plant species is used for treating diseases and other health problems. Other studies have also reported remedies prepared from a single species (Mirutse and Gobena, 2003).

The preparation of the medicines employed methods such hot decoction followed by cold decoction in water and pounding. In most cases, the plant extracts are used in combination with other plants in form of concoction, decoctions, teas and juice preparations. Yiniger *et al.*, (2008), reported that in Ethiopia majority of medicinal plant preparations were drawn from mixtures of different plant species for treatment of a single ailment.

These variations could be a factor of socio-cultural, landscapes, indigenous knowledge on synergetic effects of different medicinal plants and vegetation types. It is evident that species for medicinal plants varies from ecological zones. The residents of these areas have always relied on the sparse endemic vegetation for their health care needs. *Myrica salicifolia* and *F. salgina* are found in clusters within a specific area. People have developed the traditional medicine knowledge based on the species available in the area.

Most of the herbalists interviewed still get their plants from their place of origin. This also means that various trees may be used to treat different health problems depending on the area.

#### **2.4. Administration and dosage**

Oral administration was the predominant route of administration followed by dermal and nasal administration (Nanyingi *et al.*, 2008). The measurements used to determine the dosages were not standardized and depended on age and physical appearance of the patient, socio-cultural, diagnosis and experience of individual herbalists. The amounts of remedy and prescription rates were generally dependent on the degree and duration of the ailment. The dosage prescription for children was mostly lower than for adults. Dosages were estimated using lids, spoons, cups, glasses, pinches or handfuls. Treatment durations varied between 1 and 7 days. The herbalists also indicated that their remedies were devoid of any adverse effects. Most of the traditional healers were not preserving or storing traditional medicinal preparations for use at later date. Though the majority of healers reported that the remedies used to treat ailments had no adverse effects on patients, few healers noted the presence of some side effects in some remedies prepared from some species.

#### **2.5. The sources of herbal medicines**

Respondents indicated that the indigenous forest served as the main source of herbal medicine (76 %) while 22% was sourced from community hills and 2 % from individual farms (Table 5). Lulekal *et al.*, (2008), reported similar findings; they that 90.4% of herbal medicines in Ethiopia was sourced from the wild. This indicates that the practitioners depend on the wild sources or the natural environment rather than home gardens to obtain the medicinal extracts. Thus cultivating medicinal plants in farms was still at a low scale in the study area.

**Table 5: Sources of herbal medicines**

<b>Source</b>	<b>Respondents (%)</b>
Indigenous forest	76
Community hills	22
Individual farm	2

## **2.6. Use and popularity of indigenous herbal medicine over conventional modern medicine**

The study revealed that a significant eighty eight percent (88%) of the respondents had been treated with herbal medicine. This was a higher usage rate than has been reported in other studies (Lanfranco, 1992; Mworira, 2005; Togola *et al.*, 2005; Ramzi *et al.*, 2008).

The respondents attributed the high dependence on herbal medicine to the high cost of modern medicine and few health facilities, especially in rural remote areas. For instance, in the whole Koibatek county, there are only two hospitals, two sub-health centres, three dispensaries and eight clinics. These are hardly adequate for the increased population. By the same token, the doctor: patient ratio is also low at 1:90,000, compared to 1:2767 for herbal medicine practitioners (MOH, 2007). This implies that patients access herbalists more readily than medicinal doctors. Other studies in Kenya have also indicated that governmental health care is hard to come by in remote regions (Bussmann, 2006; Maundu *et al.*, 2001).

Economic circumstances and widespread belief in the effectiveness of many traditional therapies may have also contributed to the high dependence on herbal medicine. On average, herbalists charge between Ksh. 20 and Ksh. 150 for cases, and often the patients pay in kind. Lambert *et al.*, (2005) reported that in Sub-Saharan Africa, 480 million people (60%) do not have access to modern health care and pharmaceuticals. Khalil (2007) indicated that people's economic status, population growth and prices of pharmaceutical drugs are factors driving communities into using herbal medicines.

Moreover, most herbalists, unlike medical doctors, have some kind of follow up of their treated patients. This builds trust among the people as compared to medics whose language is not easily understood by their patients. It has also led to strengthening of traditional knowledge and acceptance of traditional medicine over time as suggested by Janovska *et al.*, (2003).

Despite immense progress in modern medicine, with modern health facilities in rural areas, traditional herbal medicine continues to be popular and flourish in Koibatek District. This is evidenced by the fact that many patients seeking herbal medication come from a wide ranging areas, with 32% coming from the county's sub-locations, 22 % coming for the locations, 19 % from the divisions, 15 % from the county itself, 8 % from the province and 4% from other parts of the country (Table 6).



**Table 6: Origin of patients**

Resident area	Patient percentage (%)
Sub-location	32
Location	22
Division	19
District	15
Province	8
Others	4

### **2.7. Transferring and learning of Indigenous knowledge**

The study also revealed that eighty nine (89%) of the practicing herbalists acquired the knowledge from the older generation and was passed orally to favourite family members who are considered trustworthy and can collect the medicinal plants solely to preserve secrecy (Table 7). According to Yineger *et al.* (2008) this transfer of knowledge and use of ethno-medicinal plants was liable to erosion because some knowledgeable elders die before they transfer the knowledge to the younger generations. Other means of acquiring the herbal knowledge is through personal experience and formal training.

**Table 7: Transfer of herbal knowledge**

Source of knowledge	Percentage (%)
Acquired	89
Experience	8
Formal	2

## 2.8. Threats to medicinal plants in natural environment

*Myrica salicifolia* was the most threatened followed by *F. saligna* and *T. asiatica* (Table 8). This ranking did not coincide with the ranking on the frequency use of the species (Table 2). This was partly because many herbalists source their plant materials from outside the county and their preferences may be different.

**Table 8: Ranking of medicinal plants based on threat score**

Species	Total score	Rank
<i>Myrica salicifolia</i>	82	1
<i>Faurea saligna</i>	76	2
<i>Ravolfia cafra</i>	64	3
<i>Albizia anthelmintica</i>	54	4
<i>Pillistigma thonginii</i>	51	5
<i>Haploculum folioloum</i>	49	6
<i>Pittosporum vilidiflorum</i>	42	7
<i>Toddalia asiatica</i>	35	8
<i>Mimusops kummel</i>	24	9

As indicated in Table 9, the main threats to medicinal plants were inappropriate harvesting methods (57 %) and deforestation (24 %). In other studies, deforestation, drought, overgrazing/over browsing and agricultural expansion, fires and charcoal burning and firewood harvesting have been reported as major threats to medicinal plants (Lulekal *et al.*, 2008, Yiniger *et al.*, 2008,). Inappropriate harvesting methods have resulted from change in harvesting techniques and people involved in harvesting. Traditionally, harvesting was only done by herbalists who took precaution to protect the exposed portions from infection and harvested amounts that did not adversely affect the tree growth. Currently harvesting is mainly carried out by hired young men (middlemen) whose payments depend on the quantities they supply to the market without regard to the health or conservation of the trees. The majority of traditional herbalists also reported that there were no taboos associated with medicinal plant collection and uses in the study area. This was not the case in other studies (Nanyingi *et al.*, 2008), where majority of the herbalists are reported as preferring to collect medicinal extracts to preserve their secrecy and only sometimes accompanied by chosen family members.

**Table 9. Major threats to medicinal plants**

Source of threats	Percentage
Inappropriate harvesting	57
Deforestation	24
Drought	7
Agricultural expansion	5
Fires	4
Others	3

Quaimbo (1992) reported that two thirds of the identified world's plant species with potential medicinal value are found in tropical forests. Due to shortage of plant sources, the available sources are overexploited. Lambert, (2005) also observed that over exploitation of medicinal plants and lack of meaningful legislation to regulate harvesting and trade were having negative effects on these resources especially in the developing countries..

The current boom in trade on traditional herbs is also contributing to overharvesting these resources and potential extinction of these species (Dery *et al.*, 1999). Over 76 % of the herbalist get their plant products from the forest. This causes a serious threat to the species.

Lack of establishment of new stands is another threat to these species as most of the rural people have no idea or tried to propagate any of the species. By combining indigenous knowledge and modern technology, communities can identify niches in their farms where these species can be established. These plants have the potential for medicinal use and as tools rehabilitate degraded lands, both of which will improve rural quality of life. They can provide an important source of household income. Collecting, trading and utilizing tree medicinal products have been reported to be important in the life of most people in Tanzania (Bery *et al.*, 1999).

### **3.0 Conclusion and recommendation**

The study revealed that herbal medicinal plants play an important part in the health care of the Tugen community, in Koibatek county, and indeed in many developing countries.

The study also indicated that the local people are very knowledgeable on medicinal tree species as they were able to identify them and their respective uses, the different ailments that are treated by the tree species, the various tree parts that are used to extract the medicines, their preparation methods, their administration and dosage. They are also familiar with different types of ailments that are treated by the local medicinal tree species, including some ailments that are commonly reported in the area by the health authorities.

The study showed that the most frequently used plant parts are the barks, followed by roots, leaves, fruit and seeds, and other parts.

According to this study, the various plant parts used for medicine were mostly processed in their fresh form, while some were used dried. Other preparation methods include: crushing, squeezing, powdering, and made into pills, adhesive plasters, decoctions, medicinal wines and medicinal butters.

Oral administration was the predominant route of administration followed by dermal and nasal administration. The measurements used to determine the dosages were not standardized and depended on age and physical appearance of the patient, socio-cultural, diagnosis and experience of individual herbalists.

The study also pointed out that the indigenous forest served as the main source of herbal medicine plants, followed by the community hilly areas, and the individual farms.

The study revealed that a significant number and proportion of the respondents had been treated with herbal medicine, which indicates a higher usage rate than has been reported in other studies.

The respondents attributed the high dependence on herbal medicine to the high cost of modern medicine and few health facilities, especially in rural remote areas.

The majority of the practicing herbalists acquired the knowledge from the older generation and was passed orally to favourite family members who are considered trustworthy and can collect the medicinal plants solely to preserve secrecy. This transfer of knowledge and use of ethno-medicinal plants was liable to erosion because some knowledgeable elders die before they transfer the knowledge to the younger generations. Other means of acquiring the herbal knowledge is through personal experience and

formal training.

Unfortunately, the art and the herbal medicine innovations are under threat from mainly inappropriate harvesting methods, deforestation, drought, overgrazing/over browsing, agricultural expansion, fires and charcoal burning and firewood harvesting.

It is important to record, document and take inventories of medicinal resources and traditional knowledge to facilitate the protection and preservation of traditional knowledge that might assist in discovery of modern medicine. Creation of legislations to regulate the harvesting of medicinal resources and create gene banks, will be useful. Incorporation of indigenous medicinal knowledge into the modern medicine to minimize fragmentation and loss of diversity

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(Note 1)

## Study Area

