



RESEARCH ARTICLE

Received on: 11-01-2014

Accepted on: 17-01-2014

Published on: 22-01-2014

**Catherine Kaluwa Kaingu**

Department of Veterinary Anatomy and Physiology, University of Nairobi, P.O Box 30197- 00100, Nairobi, Kenya.

E-mail: catekaluwa@yahoo.co.uk



QR Code for Mobile users

Conflict of Interest: None Declared !

***Ethnobotanical study of medicinal plants traditionally used in Tana River County for management of illnesses.***

**Catherine Kaluwa Kaingu<sup>a</sup>, James Mbaria<sup>b</sup>, Jemimah Achieng Oduma<sup>a</sup>, Stephen Gitahi Kiama<sup>a</sup>**

<sup>a</sup>Department of Veterinary Anatomy and Physiology, University of Nairobi, P.O Box 30197- 00100, Nairobi, Kenya.

<sup>b</sup> Department of Public Health, Pharmacology and Toxicology, University of Nairobi, P.O Box 30197- 00100, Nairobi, Kenya.

**ABSTRACT**

*Aim of the study: The objective of the study was to identify and document medicinal plants traditionally used by people of Tana River County, Kenya for the management of various ailments.*

*Materials and methods: The study was conducted in March 2012. Information was gathered from 80 traditional practitioners who lived and practiced in Garsen, Itsowe and Ngao Subdivisions of Tana River using semi-structured questionnaires and focused group discussion. Voucher specimen of cited plants were collected and deposited at the university of Nairobi herbarium.*

*Results: A total of 31 plants distributed in 25 families were identified. The most popular plant species were eleven and were used for the management of pneumonia, arthritis, kidney problems, fibroids, typhoid, breast cancer, tooth ache, malaria, diabetes, convulsions, stomach ache, constipation, poisoning, cholera, diarrhea, mastitis, migraine, tonsillitis, ulcers, asthma, high blood pressure, urinary incontinence, body warts, milk letdown and as immune boosters. Conclusion: The use of herbs is still very common amongst Tana River inhabitants and the healers still rely largely on naturally growing plant species in their locality. Furthermore, the documented medicinal plants can be used as a basis for future phytochemical and pharmacological studies.*

**Keywords:** medicinal plants, indigenous management of illnesses Tana River.

**Cite this article as:**

Catherine Kaluwa Kaingu, James Mbaria, Jemimah Achieng Oduma, Stephen Gitahi Kiama.

Ethnobotanical study of medicinal plants traditionally used in Tana River County for management of illnesses.

Asian Journal of Complementary and Alternative Medicine 02 (02); 2014; 01-05.

## 1. INTRODUCTION

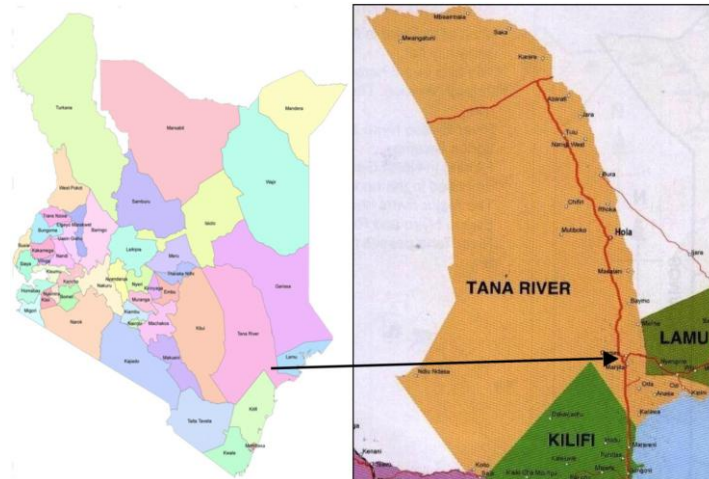
Eighty percent of the population in Tana River County still relies on traditional healers for their day-to-day health care Kaingu et al. (2013). Traditional practitioners in Tana River are routinely consulted by the community as they have a rich indigenous knowledge base and are always available. This tradition has persisted partly due to inequitable health facilities with 75% of facilities and personnel being concentrated in urban areas (National Policy of Traditional Medicine 2005); but also the doctor patient ratio being 1: 95,500 in Tana River; while the corresponding ratio of Traditional Medicinal practitioners to patients is 1: 987 (Kenya census report, 2009) emphasizing a serious shortage of both health facilities and staff. The objective of the study was to identify and document plants that are used for the management of illnesses in both males and females. An ethno botanical survey was carried out in Tana River County to achieve the objective. The plant parts, route of administration, method of preparation, dose and whether the plant was administered as a concoction was also documented.

## 2. MATERIAL AND METHODS

### Study area identification and description:

A reconnaissance survey was undertaken in Tana River County in March 2012, to identify key informants for the study. Local administrators were chosen as key resource persons in providing information on herbal practitioners. Discussions with these key informants led to Garsen, Itsowe and Ngao subdivisions being chosen as most suitable study areas due to widespread use of herbal medicine and relative in accessibility to health facilities. Tana River County; is one of the seven counties in Coast province. It shares boundaries with Kitui to the West, Mwingi to the North West, Garissa to the North East, Ijara to the East, Meru North and Isiolo to the North, Lamu to the South East and Malindi to the South West. It also borders the Indian Ocean to the South with a coastal strip of 35Km. The total land size is 38, 782Km<sup>2</sup>. The County lies between latitude 0° and 3° South and longitudes 38°30' east and 40°15' east. According to the population and housing census report 2009; the County has a population of 240 075 persons. Ninety six percent of Tana River County lies in the coastal lowland zone six IFAD (1990) which is characterized by low, erratic rainfall and high temperature. The rainfall is low, bimodal and erratic with a mean annual range of 300-500mm. Long rains occur in the months of April and May while short rains occur in the months of October and November. The average annual temperatures are approximately 30°C. On the other hand, along the coastal line there are humid conditions. The coastal region

receives upto 1200mm of rain annually although it varies and is highly unreliable. The levels of poverty are very high. It is estimated that 72% of the total County population live below the poverty line. Acute droughts often accompanied by destitution and ethnic conflict revolving around sharing of natural resources are partly responsible for the high poverty incidence. Both drought and ethnic conflict retard development, consequently entrenching poverty Omosa (2005). The County is inhabited by various ethnic groups; the main ones being Pokomo, Wardei, Somali, Malakoti, Munyoyaya, Wata, Bajuni and Mijikenda. The Pokomo, Munyoyaya, Malakote and Mijikenda are involved in farming activities while the Orma, Wardei and Somali are mainly cattle keepers. Most villages are found along the River Tana where farming is favorable. The pastoralists are mainly found in the hinterland and live in *manyattas* concentrated around watering points like dams, wells and boreholes.



**Figure 1:** The map of Tana River County, Kenya (Source: Department of Geography University of Nairobi). Key: Arrow points at area of study: Garsen, Itsowe and Ngao subdivisions.

### Target population, study design and data collection:

The county has a high number of practicing herbalists, who were the target population for the ethno botanical survey. The herbalists were derived from the main tribes living in the study area; Pokomo, Ormas and Giriya. The study design was a cross sectional survey and systematic random sampling was used to identify 80 practicing herbalists as participants. Semi structured questionnaires were used to document ethnotherapeutic practices in Garsen, Itsowe and Ngao subdivisions of Tana River by a team of local translators, botanist and researchers. Interviews with informants were conducted in Pokomo, Orma or Giriya languages assisted by local translators, and responses were recorded in English.

### Collection of plant sample and identification:

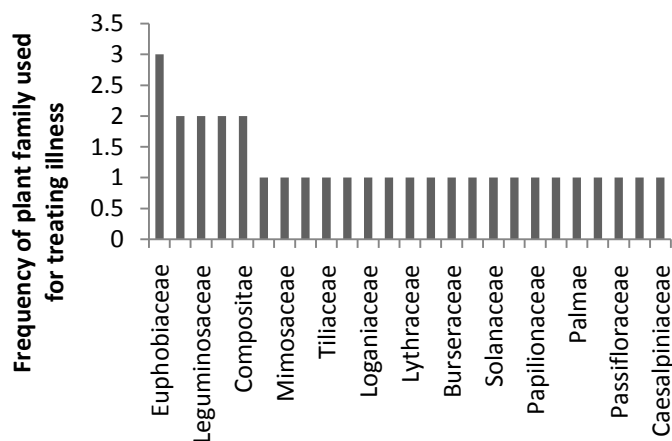
Plants used for herbal remedies were collected by a team comprising of herbalists, a botanist and researchers from the University of Nairobi. The plants were identified by a taxonomist and voucher specimens deposited at the University of Nairobi Herbarium. The information gathered included vernacular name of plant, species, ailments they cure, part used, route of administration, method of preparation, dose and duration levels of herbal administration, whether the remedy was administered as a concoction or decoctions.

**Sample size determination, statistical analysis and reporting:**

Sample size was determined by use of Fisher et al (1998) formula;  $n = Z^2 pq / d^2$  whereby n= the desired sample size; z= the standard normal deviate at required confidence level; p= the proportion in the target population estimate to have characteristics being measured; q= 1-p; d= the level of statistical significance set. The collected data was analyzed and reported using percentages and proportions. The value of a botanical family was calculated as  $(FUV) = UV_s / n_f$ , where  $n_f$  is the number of plant species reported in the family. The relative medicinal importance of individual plant species in the community was assessed by calculating their use values (UVs) by the method described by Phillips (1993), where use value of a species (UVs) =  $\text{Sum}(UV_{is} / n_s)$ , where  $UV_{is}$  is the use value of one plant species to one informant and  $n_s$  is the number of informants citing use of the species. Our assumption was that any informant had equal chances of mentioning any of the species used in medicinal purposes in the area as we administered a standard questionnaire.

**3. RESULTS AND DISCUSSION**

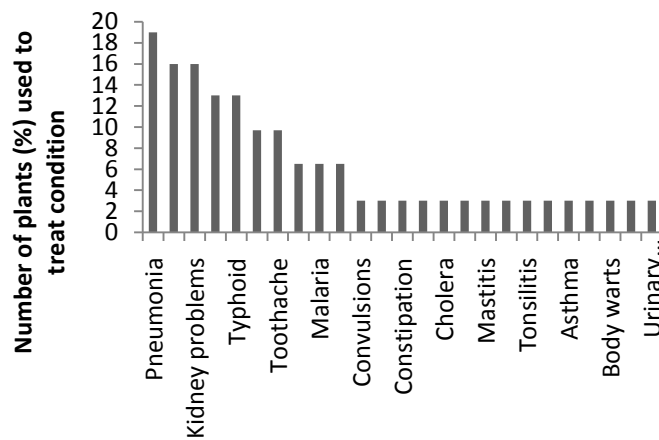
A total of 80 herbalists from the study site were interviewed. Thirty one plant species belonging to 25 plant families were identified for the management of illnesses (Figure 2).



**Figure 2:** Frequency of plant family used for the management of illnesses in Tana River County.

The commonest plant family was Euphobiaceae, Salvadoraceae, Leguminosaceae, Olacaceae,

Compositae, Bignonaceae, Mimosaceae, Vitaceae, Tiliaceae, Capparaceae, Loganiaceae, Simorobaceae, Lythraceae, Apocynaceae, Burseraceae, Labiatae, Solanaceae, Pedaliaceae, Papilionaceae, Malvaceae, Palmae, Rutaceae, Passifloraceae, Amaranthaceae and Caesalpiniaceae. Six plant species (19%) were used to treat pneumonia; probably the condition is very common amongst the 3 communities in the study area and this might account for more plant species treating the condition. Kaingu et al. (2011) reported a similar finding in Machakos District, Kenya. Arthritis was also very common in Tana River and 16% of the plant species were reported to be effective in treating the condition. It was also interesting; that 16% of the medicinal plants were used to manage kidney problems, 13% to manage fibroids, 13% to treat typhoid, 9.7% to treat breast cancer, 9.7% to treat toothache, 6.5% to treat boils, 6.5% to treat malaria and 6.5% to treat diabetes (Figure 3). Some of the remedies might contain antimicrobial properties, emetics, excitants and digestives. These were used to manage convulsions, stomach aches, constipation, poisoning, cholera, diarrhea, mastitis, migraine, tonsillitis, stomach ulcers, asthma, high blood pressure, urinary incontinence, body warts and to induce milk letdown as shown in Table 1. The most popular plant species in decreasing order were *Harrisonia abyssinica*, *Strychnos henningsii*, *Lawsonia inermis*, *Acacia robusta*, *Solanum incunum* that were cited by herbalists for the management of three to five conditions as calculated by their use values (Table 1). Considering that for 83% of the plant species, the most commonly used plant part was the root; issues of conservation should be looked into. In the current study, the herbalists were not worried about conserving or using alternative plant parts as they had easy access to the bushy woodland.



**Figure 3:** Percentage frequency of plants used to treat illnesses in Tana River County.

Key: MLD- milk let down; HBP- high blood pressure.

The most common method of preparation included boiling or soaking in water while the preferred route of administration was oral. These methods of remedy preparation and dosing are quite similar to those

reported in other studies Muthee et al. (2011), Nanyingi et al. (2008). The respondents administered different doses of remedy and durations for similar conditions. The present study has shown that the people in Tana River County have a very good knowledge base on herbal remedy for primary health care. Traditional healers still rely largely on naturally growing species in their locality. Furthermore, the documented medicinal plants can be used as a basis for future phytochemical and pharmacological studies.

#### CONFLICT OF INTEREST

The authors declare that there was no competing interest.

#### Acknowledgement

The authors acknowledge financial support from Regional Initiative in Science Education- Africa Natural product Network (RISE-AFNNET) that is funded by Carnegie Foundation. The funding enabled the ethno botanical study to be carried out successfully. Technical support in identification of plant specimen by Mr. Patrick Chalo Mutiso of the University of Nairobi herbarium is acknowledged. Authors also thank the Pokomo, Ormo and Giriyama medicinal practitioners for their invaluable information during the study.

| Family          | Species, voucher number.   | Local name   | Method of preparation, route of administration and dose levels.   | Ethnotherapeutic uses in Tana river | FV | SU <sub>v</sub> |
|-----------------|--|--|---|-------------------------------------|----|-----------------|
| Amaranthaceae   | <i>Achyranthes aspera</i> L. CKK060                                      | Kinamaha (Pokomo)                                      | Roots boiled in water and decoction taken orally. Half glass daily for 2 days.  | Typhoid, arthritis                  | 1  | 2               |
| Apocynaceae     | <i>Hunteria zaylanica</i> (Zetz.) Gard ex thr var CKK041                 | Mutsungutsungu, (pokomo)                               | Roots boiled in water and decoction taken orally. Half glass daily for 3 days.  | Induces milk letdown after delivery | 1  | 1               |
| Bignoniaceae    | <i>Markhamia zanzibarica</i> CKK014                                      | Mubwoka (Pokomo)                                       | Roots or leaves boiled in water and decoction taken orally. Half glass twice a day for 5 days.                            | Fibroids, breast cancer             | 1  | 2               |
| Burseraceae     | <i>Commiphora habessinica</i> (O. Berg) Engl. CKK050                     | Mutsutsu (Pokomo)                                      | Roots boiled in water and decoction taken orally. Half glass taken once.  | Toothache                           | 1  | 1               |
| Caesalpiniaceae | <i>Cassia abbreviate</i> CKK059  | Mubaraka waga (pokomo)                                 | Roots boiled in water and decoction taken orally. Half glass daily for 3 days. The decoction also used to wash the boils. | Boils                               | 1  | 1               |
| Capparaceae     | <i>Thylachium thomasii</i> Gilg CKK024                                   | Uhiya, kukube (Orma)                                   | Roots boiled in water and decoction taken orally. Half glass daily for 3 days.  | Arthritis                           | 1  | 1               |
| Compositae      | <i>Sonchus oleraceus</i> L. CKK061                                       | Mtsunga (Pokomo)                                       | Leaves squeezed to obtain sap. One teaspoonful taken once.  | Tonsils                             | 2  | 1               |
| Compositae      | <i>Pluchea ovalis</i> (Pers.) DC CKK010                                  | Msasa (Pokomo)   | Leaves boiled. The decoction used to wash the affected area of body daily for 2 weeks.                                    | Body warts                          | 2  | 1               |
| Euphobiaceae    | <i>Suregada zanzibariensis</i> Boull CKK022                              | Mudimu tsaka (Giryama)                                 | Boil fresh roots in water and decoction taken orally. Half glass 3 times daily for 4 days                                 | Stomach ache                        | 3  | 1               |
| Euphobiaceae    | <i>Flueggea virosa</i> (Willd.) Voigt ssp. <i>virosa</i> CKK062          | Mupambaa (Pokomo)                                      | Roots boiled in water and decoction taken orally. Half glass daily for 2 days.  | Kidneys                             | 3  | 1               |
| Euphobiaceae    | <i>Ricinus communis</i> L. CKK016  | Mubonye, Mbono (Pokomo)                                | 2 dried fruit split and crushed. Mixed with water. Daily for 7 days.  | Migraine                            | 3  | 1               |
| Labiatae        | <i>Hoslundia opposita</i> Vahl CKK045                                    | Mtserere (Pokomo)                                      | Roots boiled in water and decoction taken orally. Half glass daily for 2 days.  | Kidney problems                     | 1  | 1               |
| Leguminosaceae  | <i>Albizia gummifera</i> CKK063  | Habecho (Orma)   | Boil roots in water and decoction taken orally. One glass per day for 2 days.   | Typhoid                             | 2  | 1               |
| Leguminosaceae  | <i>Acacia zanzibarica</i> (S. Moore) Taub. Var <i>Zanzibarica</i> CKK004 | Muryela (Pokomo), muhegakululu (Giryama), Wachu (Orma) | Root bark boiled in water and decoction taken orally. Half glass daily for 3 days   | Arthritis, mastitis                 | 2  | 2               |
| Loganiaceae     | <i>Strychnos</i>   | Mumalindi  | Leaf and stem bark boiled in  | Kidneys, resistant typhoid,         | 1  | 4               |

|                |   |   |  |   |   |   |
|----------------|---|---|--|---|---|---|
|                | <i>henningsii</i> Gilg<br>CKK057  | (Pokomo)  | water and decoction taken orally.<br>Half glass twice a day for 3 days.  | pneumonia, malaria  |   |   |
| Lythraceae     | <i>Lawsonia inermis</i><br>L. CKK048                                    | Musuruja<br>(Pokomo)  | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 30 days   | Immune booster, fibroids,<br>treats poisoning and<br>constipation through<br>causing diarrhea | 1 | 4 |
| Malvaceae      | <i>Thespesia danis</i><br>Oliv. CKK064                                  | Mudanisa<br>(Pokomo)  | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 3 days. Leaves squeezed<br>and one teaspoonful mixed with<br>the root decoction | Pneumonia, high blood<br>pressure   | 1 | 2 |
| Mimosaceae,    | <i>Acacia robusta</i><br>CKK058   | Munga<br>(Pokomo)   | Roots or leaves boiled in water<br>and decoction taken orally. Half<br>glass daily for 5 days.<br>Smear part of fluid on affected<br>joints.                 | Fibroids, boils, arthritis  | 1 | 3 |
| Olacaceae      | <i>Ximenia<br/>americana</i> L.<br>CKK033                               | Muntuntuda,<br>mtundukula<br>(Pokomo),<br>huda hudo<br>(Orma) | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 5 days  | Anti-diarrhea   | 2 | 1 |
| Olacaceae      | <i>Capparis sepiaria</i><br>Var. <i>caffra</i><br>CKK039                | Hamwalika<br>(Pokomo),<br>mugwada paka<br>(Giryama)           | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 3 days  | Fibroids, pneumonia   | 2 | 2 |
| Palmae         | <i>Phoenix reclinata</i><br>Jacq. CKK054                                | Mukindu<br>(Pokomo)   | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 3 days.   | Toothache   | 1 | 1 |
| Papilionaceae  | <i>Abrus precaterius</i><br><i>L.sp africana</i><br><i>verde</i> CKK055 | Mudanda,<br>muturituri,<br>mudwadwa<br>(Pokomo)               | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 2 days.   | Asthma, pneumonia   | 1 | 2 |
| Pedaliaceae    | <i>Pedaliium murex</i> L.<br>CKK005                                     | Mbigili<br>(Pokomo)   | Roots boiled in water and<br>decoction taken orally. Half glass<br>daily for 3 days.   | Kidneys, vaginal warts  | 1 | 2 |
| Passifloraceae | <i>Adenia gummifera</i><br>(Harv.) Harms<br>CKK019                      | Mujoka<br>(Pokomo)  | Roots or stem bark boiled in water<br>and decoction taken orally. Half<br>glass daily for 3 days.  | Fibroids  | 1 | 1 |

#### 4. REFERENCES

1. Fisher AA, Lang JE, Stoeckel JE, Townsend JW, Handbook for Family Planning Operations and Research Design 2nd Edition (Population Council of Nairobi, Republic of Kenya), 1998.
2. Kaingu CK, Oduma JA, Kanui TI, Practices of traditional birth attendants in Machakos District Kenya. *Ethnopharmacology*. 2011; 137: 495-502.
3. Kaingu CK, Oduma JA, Mbaria JM, Kiama SG. Ethnobotanical Survey of Medicinal Plants Used For the Management of Male Sexual Dysfunction and Infertility in Tana River County, Kenya, *Ethno and Trad Medicine*. Photon. 2013; 119: 453-463.
4. Kenya Population and Housing census report 2009.
5. Muthee JK, Gakuya DW, Mbaria JM, Kareru PG, Mulei CM, Njonge FK. Ethnobotanical study of anthelmintic and other medicinal plants traditionally used in Loitokitok district of Kenya, *Ethnopharmacology*. 2011; 135: 15-21.
6. Nanyingi MO, Mbaria JM, Lanyasunya AL, Wagate CG, Koros KB, Kaburia HF, Munenge RW, Ogara WO. Ethnopharmacological survey of Samburu district Kenya. *Ethnobiology & Ethnomedicine*. 2008; 4: 14.
7. National Policy on Traditional Medicine and regulation of herbal medicines-Report of a WHO Global survey 2005.
8. Omosa EK (2005). The Impact of Water Conflicts on Past oral Livelihoods: The case of Wajir District in Kenya. Winnipeg: International Institute for Sustainable Development.
9. Phillips O, Gentry AH . The useful plants of Tambopata Peru: I. Statistical hypotheses tests with a new quantitative technique. *Economic Botany*. 1993; 47: 15-32.
10. The International Fund for Agricultural Development (IFAD). Republic of Kenya upper Tana catchment natural resource management project. Project design report 1990.