**Kigen et al., Afr J Tradit Complement Altern Med. (2016) 13(3):156-168**
http://dx.doi.org/10.4314/ajtcam.v13i3.19

# ETHNOPHARMACOLOGICAL SURVEY OF THE MEDICINAL PLANTS USED IN TINDIRET, NANDI COUNTY, KENYA

**Gabriel Kigen[1], Alice Maritim[1], Fatuma Some[2], John Kibosia[3], Hillary Rono[4], Simon Chepkwony[5], Wilson Kipkore[6] and Bernard Wanjoh[7]**

[1]Department of Pharmacology and Toxicology, Moi University School of Medicine, P.O. Box 4606, Eldoret, Kenya
[2]Department of Medicine, Moi University School of Medicine, P.O. Box 4606, Eldoret, Kenya
[3]Department of Surgery, Moi Teaching and Referral Hospital, P.O. Box 3, Eldoret, Kenya
[4]Hillary Rono, Opthalmologist Kitale County Hospital and London School of Tropical Medicine & Hygiene, P.O. Box 98, Kitale Kenya, [5]Practising Herbalist, P.O. Box 36, Songhor, Kenya, [6]Department of Forestry, University of Eldoret, P.O. Box 1125, Eldoret, Kenya, [7]Department of Wildlife Management, University of Eldoret, P.O. Box 1125, Eldoret, Kenya
***Corresponding Author E-mail**: kigengfk@gmail.com

## Abstract

**Background:** An inventory of the medicinal plants used by herbalists to treat various ailments in Tindiret area of Nandi County, Kenya was conducted by a team comprising of medical researchers and botanists with a view to preserve indigenous ethnobotanical knowledge and potential research and development of new drugs.
**Materials and Methods:** Data was collected from practicing herbalists through semi-structured interviews, group discussions and observations. The types of medical conditions treated, treatment methods as well as the plants used were recorded.
**Results and Conclusion:** A total of 50 medicinal plants belonging to 28 families used for the treatment of 32 medical conditions were recorded. The disease conditions which were treated by the highest number of plants were abdominal/colic pains with 15 different plants recorded (13%), respiratory disorders 15(13%) and infertility14 (12%). The most widely used medicinal plants were *Vernonia amygdalina* 7(7%), *Toddalia asiatica* 6(6%), *Aloe kedongensis* 5(5%) and *Zanthoxylum gilletii* 5(5%); whereas the families with the highest number of plant usage were *Fabaceae* 8(14%), *Lamiaceae* 4(8%) and *Solanaceae* 4(8%) plants respectively. The study documents important ethno-medical knowledge on the plants used by herbalists in Tindiret sub-county.

**Key words:** Ethnopharmacology, Indigenous knowledge, Traditional medicine, Research, Conservation

## Introduction

Ethnopharmacology is broadly defined as the study of substances used medicinally, often derived from plants, by different ethnic groups. Historically, natural products have been used as ingredients to develop new drugs, and are still an important source (Koehn et al., 2005; Li et al., 2009; Heinrich, 2014). Unlike Asia, many of the traditional plants used by herbalists have not been documented in Kenya, despite the risks of the knowledge disappearing, owing to several factors (Kigen GK et al., 2013). The documentation of the various plants and their medicinal uses will therefore conserve indigenous knowledge and provide an important database for future research and potential development of new drugs.

## Materials and Methods

### Study Area

The survey was conducted in Meteitei area of Tindiret Sub-county, in the southern part of Nandi County **(Figure 1).** The County is located in the western part of Kenya at longitude 35°25″E. latitude 0°34″N and covers an area of 2,884 km² (Nandi, 2013; Wikipedia, 2013). It is endowed with a beautiful topography that mainly consists of the scenic Nandi Hills. It has rich volcanic soils, cool and wet climate with temperatures ranging from 15°C to 26°C, with rainfall of between 1,200mm and 2,000mm per annum. Tindiret region is characterized by a mountainous terrain (up to 2150m), with steep slopes descending into the Nyando escarpment (1300m). This provides varied ecological zones with swathes of the Nandi forest at the top and wood, bushes and savannah grassland with swamps at the escarpment (Nandi, 2013). The residents in the county are mainly Nandis, one of the larger Kalenjin subtribes (Gabriel Kigen et al., 2014; Wikipedia, 2015).


**Figure 1:** Map of Nandi County showing its position relative to the Kenyan Map and various sub- counties. *Accesed on 24/04/2015 from KENYA MPYA -http://www.kenyampya.com/index.php?county=Nandi*

**Data Collection**

Field surveys were carried out between February 2013 and July 2014. The research team consisted of professionals from the medical field and botany. It included two pharmacologists (GK & AM), one physician (FS), a surgeon (JK), an ophthalmologist (HR), a taxonomist (BW) and a plant specialist (WK). We also had two local herbalists (SC and Emily) who accompanied us each time we visited their colleagues. Semi structured interviews were used to collect information from the herbalists. The interviews were conducted in Kalenjin or Kiswahili, and were done at their practices, which in most cases were their residences. We interviewed a total of 45 herbalists aged between 38 and 70 years, with majority being female (28). Details of the medical conditions treated including the symptoms, methods of treatment, plants and herbal preparations used, local plant names, methods of collection of the herbs and any other information relevant to the practice were recorded. In case there were any patients undergoing treatment, they were also interviewed in order to corroborate the evidence of their treatment with the claims by the herbalists. Following the interviews, the informants were requested to accompany the research team to the fields in order to identify the plants used. The plant specimen and their habitats were then photographed and collected. The collected specimens were then identified by BW and WK as per taxonomic keys (Beentje et al., 1994; Agnew, 2013), and the voucher specimens pressed, dried and deposited at the University of Eldoret Botanical Herbarium.

## Results

A total of 50 medicinal plants belonging 28 families were identified **(Table 1, 2).** We did not manage to see two plants going by the local names of ***"Mborusiat"*** and ***"Kipchilgatwet"*** which are used in the treatment of respiratory disorders and abdominal pains/diarrhoea respectively. We were informed that the first plant is found in deep forest, whereas the second is found in the rocky areas

http://dx.doi.org/10.4314/ajtcam.v13i3.19

in the highlands; both areas having rough terrain which we could not access. There were also three other plants which we identified *Artemesia abbysinica, Pseudarthria hookeri & Tithonia diversifolia* that none of the herbalists could remember their traditional names.

**Table 1:** Medicinal Plant Uses

| | Botanical name | Family | Local Name | Voucher No. | Parts used | Method of preparation | Plant Uses |
|---|---|---|---|---|---|---|---|
| 1. | *Ajuga remota* Benth | LAMIACEAE | *Chelelgatiat* | WK/02/15/045 | *Leaves* | *Press/crush leaves and add water* | *Abdominal pain & coughs in children* |
| 2. | *Albizia gummifera* (J.F.Gmel.) C.A. Sm | FABACEAE | *Seet* | WK/02/15/011 | *Bark* | *Boiled (oral thrush), For post partum bleeding, crush bark and add a little water and administer* | *Oral thrush in children Post partum bleeding* |
| 3. | *Aloe kedongensis* Reynolds | ALOACEAE | *Tangaratwet* | WK/02/15/044 | *Roots* | *Boiled &administered* | *Abdominal pain in infants, rashes (ringworms), common colds, infertility in women* |
| 4. | *Artemesia abbysinica* Sch.Bip. ex A.Rich | ASTERACEAE | *No name* | WK/02/15/024 | *Leaves* | *Boil leaves* | *Heavy bleeding during periods (menorrhagia)* |
| | | | | | | *Pound leaves and administer to chicken* | *Diarrhoea in chicken, cows* |
| 5. | *Asparagus racemosus* Willd. | ASPARAGACEAE | *Chepsabeiyat* | WK/02/15/014 | *Roots* | *Boiled* | *Arthritis, infertility in women, cancer* |
| 6. | *Basella alba* L. | BASELLACEAE | *Ndaramiat* | WK/02/15/042 | *Roots, leaves* | *Boiled* | *Abdominal/colic pain in infants("Surunda"), anaemia (increases blood count)* |
| 7. | *Carissa edulis* (Forsk.) Vahl | APOCYNACEAE | *Legetetyot, Tamuryakyat,* | WK/02/15/001 | *Roots* | *Boiled* | *Abdominal pains, infertility in women* |
| 8. | *Cascabela thevetia* (L.) Lippold | APOCYNACEAE | *Chepnyalildet* | WK/02/15/029 | *Latex* | *Apply latex to wound* | *Wounds* |
| 9. | *Clematis simensis* Fresen | RANUNCULACEAE | *Sesyat /N'gososyat (Tugen)* | WK/02/15/002 | *Leaves and flowers* | *Pressed, or dried and ground to powder and inhaled* | *Sinusitis, allergy, common colds, cough, wheezing, chest pain, blocked nose, (goroitab ngwony)* |
| 10. | *Combretum collinum* Fresen | COMBRETACEAE | *Buukwet* | WK/02/15/039 | *Bark* | *Boiled* | *Infertility in women* |
| 11. | *Commiphora africana* (A.Rich.) Engl. | BURSELACEAE | *Chepkilgong* | WK/02/15/005 | *Bark, fruits* | *Boiled* | *Abdominal pains, renal disease* |
| 12. | *Croton macrostachyus* Hochst ex Del. | EUPHORBIACEAE | *Tebeswet* | WK/02/15/007 | *Bark* | *Boiled* | *Respiratory disorders, common colds in children* |
| 13. | *Cucumis prophetarum* L. | CUCURBITACEAE | *Chepkeswot/ Chelulugu* | WK/02/15/040 | *Fruits* | *Boiled* | *Emetic (To induce vomiting in order to remove phlegm to treat malaria, infertility,* |
| 14. | *Dovyalis abyssinica* (A.Rich.) Warb. | FLACOURTIACEAE | *Kapchobiniot* | WK/02/15/014 | *Roots* | *Boiled* | *Chemurmugulel/Kipgarasit (spleenomegally),arthritis, infertility in women* |
| 15. | *Engleromyces goetzei* P.Henn. | XYLARIACEAE | *Bobatabtegat* | WK/02/15/042 | *Whole plant* | *Boiled* | *Respiratory disorders* |
| 16. | *Ensete ventricosum* (Welw.) Cheesman | MUSACEAE | *Sassuryet* | WK/02/15/049 | *Roots* | *Boiled* | *Infertility in both men and women* |
| 17. | *Entada abyssinica* Steudel ex A. Rich. | FABACEAE | *Katutwet* | WK/02/15/012 | *Bark* | *Boiled* | *Infertility in women* |
| 18. | *Erythrina* | FABACEAE | *Kakorwet* | WK/02/15/017 | *Bark* | *Crush and add water* | *Abdominal/colic pain in* |

http://dx.doi.org/10.4314/ajtcam.v13i3.19

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | *abysinica* DC | | | | | | *children, chickenpox & infertility in men* |
| 19. | *Euclea divinorum* Hiern | EBENACEAE | *Uswet* | WK/02/15/013 | *Roots* | *Chewed* | *Cathartic* |
| 20. | *Flacourtia indica* (Burm.f.) Merr. | FLACOURTIACEAE | *Tangururwet* | WK/02/15/018 | *Leaves* | *Boiled* | *Measles* |
| | | | | | *Bark* | *Boiled* | *Chicken pox* |
| 21. | *Gardenia volkensii* **K.Schum** | RUBIACEAE | *Kebulwet* | WK/02/15/031 | *Bark* | *Added to warm water and administered* | *Emetic* |
| 22. | *Hypoestes verticillaris* (L.f.) Roem&Schult | ACANTHACEAE | *Turkwot* | WK/01/15/016 | *Leaves* | *Press and apply the sap on the wound* | *Wounds* |
| 23. | *Kalanchoe crenata* (Andrews) Haw. | CRASSULACEAE | *Guserwet* | WK/02/15/030 | Leaves | *Sap applied* | *Unhealed navel in children to prevent infections* |
| | | | | | | *Burn leaves and massage inflamed area* | *Muscle sprain, myalgia (poultice)* |
| 24. | *Lagenaria abyssinica* (Hook.f) C.Jeffrey. | CUCURBITACEAE | *Motondorwet* | WK/02/15/047 | Leaves | *Burnt leaves (busaruk)* | *Coughs* |
| 25. | *Leucas calostachys* Oliv. | LAMIACEAE | *Ngechebchat* | WK/02/15/048 | *Leaves* | *Chewed* | *Common colds, coughs* |
| 26. | *Markhamia acuminate* K. Schum. | BIGNONIACEAE | *Chepsigiryet* | WK/02/15/034 | *Bark* | *Boiled* | *To prevent abdominal pains/ bleeding & oedema in pregnacy* |
| 27. | *Markhamia lutea* (Benth.) K. Schum. | BIGNONIACEAE | *Mobet* | WK/02/15/028 | *Roots* | *Boiled* | *Arthritis, Inflammation(swelling) of the skin, myalgia* |
| 28. | *Melia azedarach* L. | MELIACEAE | *Mwarbaini* | WK/02/15/032 | *Bark, leaves* | *Boiled* | *Abdominal pains, STDs* |
| 29. | *Momordica foetida* Schumach. | CUCURBITACEAE | *Cheptenderet/ Mandereriat* | WK/02/15/021 | *Leaves, Roots* | *Press and inhale* | *"Gorotab ngwony"(trigeminal neuralgia, sinusitis)* |
| 30. | *Ozoroa insignis* Delile | ANACARDIACEAE | *Chepkiton'gyot* | WK/02/15/003 | *Leaves* | *Sap applied on affected areas* | *Mumps* |
| 31. | *Periploca linearifolia* Dill & A. Rich | APOCYNACEAE | *Sinendet* | WK/02/15/026 | *Roots* | *Roots, mixed with milk* | *Infertility, abdominal/colic pains in women, ulcers* |
| 32. | *Plectranthus barbatus* Andr. | LAMIACEAE | *Irokwet (Nandi), Moron'get (Kipsigis)* | WK/02/15/023 | *The two topmost tender leaves* | *Crush and mix with water and administer* | *Abdominal/colic pain in infants* |
| 33. | *Plectranthus barbatus var.grandis* (L.H.Cramer) Lukhoba&A.J.Paton | LAMIACEAE | *Irokwetab goik* | WK/02/15/033 | *Tuber* | *Boil* | *To stop diarrhea and vomiting in infants* |
| 34. | *Pseudarthria hookeri* Wight&Arn. | FABACEAE | *No name* | WK/02/15/035 | *Roots* | *Boiled* | *Abdominal pains, diarrhoea* |
| 35. | *Pterolobium stellatum* (Forssk.) Brenan | FABACEAE | *Kipkosgosit* | WK/02/15/009 | *Roots* | *Boiled* | *Common colds, persistent cough (asthma), spleenomegally* |
| 36. | *Rhamnus prinoides* L'Hér. | RHAMNACEAE | *Kosisityet* | WK/02/15/052 | *Roots* | *Boiled* | *Spleenomegally, infertility, cancer* |
| 37. | *Rhoicissus tridentata* (L.f.) Wild & R.B. Drumm. | VITACEAE | *Torotwet* | WK/02/15/036 | *Tuber* | *Sap from tuber* | *Wounds* |
| 38. | *Senna* | FABACEAE | *Senetwet* | WK/02/15/004 | *Leaves* | *Boiled* | *Cathartic* |

**http://dx.doi.org/10.4314/ajtcam.v13i3.19**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | *didymobotrya* (Fresen.) Irwin &Barneby | | | | | | |
| 39. | *Solanum aculeastrum* Dunal | SOLANACEAE | *Sigowet* | WK/02/15/037 | *Roots* | *Boiled* | *Pneumonia in both children and adults, liver disease* |
| | | | | | | | *Talisman - Children bathed in concoction to prevent ill omen from people with bad eyes* |
| | | | | | *Fruit* | *Cut &pressed* | *Ringworms* |
| 40. | *Solanum aculeatissimum* Jacq. | SOLANACEAE | *Labotwetab kimagetiet* | WK/02/15/020 | *Roots* | *Boiled* | *Asthma, persistent cough, common colds* |
| 41. | *Solanum mauritianum* Scop. | SOLANACEAE | *Labotwetab timin* | WK/02/15/027 | *Roots* | *Boiled* | *Pneumonia, persistent cough, asthma, malaria, spleenomegally* |
| 42. | *Solanum sessilistellatum* Bitter | SOLANACEAE | *Labotwet* | WK/02/15/010 | *Fruit* | *Sap applied to affected teeth or ringworms* | *Teeth, ringworms, rashes in children* |
| 43. | *Syzygium cordatum* Hochst.exC.Krauss | MYRTACEAE | *Lamaiywet* | WK/02/15/008 | *Bark* | *Boiled* | *Common colds, diarrhoea* |
| 44. | *Tithonia diversifolia* (Hemsl.) Gray | ASTERACEAE | *No name* | WK/02/15/025 | *Leaves* | *Burnt leaves massaged on affected area* | *Poultice -sprain* |
| | | | | | | *Pound leaves and administer* | *Diarrhea in cows and chicken* |
| 45. | *Toddalia asiatica* (Linn.) Lam. | RUTACEAE | *Kipkombotyet (Nandi), Chepindorwet (Kipsigis)* | WK/02/15/022 | *Roots, leaves* | *Boiled* | *Abdominal pains, gynaecologic disorders including infertility, common colds (cough/colds), cancer, renal disorders* |
| 46. | *Tylosema fassoglensis* (Schweinf.) Torre & Hillc. | FABACEAE | *Cheptebesiet* | WK/02/15/041 | *Tuber* | *Boiled* | *Epilepsy, infertility in women, renal disease, cancer* |
| 47. | *Urtica massaica* Mildbr. | URTICACEAE | *Ziwot* | WK/02/15/046 | Leaves | Boiled | *Abdominal pains especially in infants* |
| 48. | *Vernonia amygdalina* Delile | ASTERACEAE | *Mororwet* | WK/02/15/019 | Roots | Boiled | *Abdominal pains in infants, in pregnancy, arthritis, meningitis, malaria, typhoid, epilepsy* |
| 49. | *Zanthoxylum gilletii* (De Wild.) P.G.Waterman | RUTACEAE | *Sagawaita* | WK/02/15/038 | Bark | Boiled, Chewed | *Colic pain, hepatomegally, severe inflammation (swelling) of the body, tongue* |
| | | | | | | *Grind bark and combined with resin and inhale* | *Rx of anthrax* |
| 50. | *Ziziphus mucronata* Willd. | RHAMNACEAE | *Chemanambelio* | WK/02/15/006 | *Bark* | *Boiled* | *Abdominal pain* |
| 51. | | | *Kipchilgatwet (Nandi) /Nyalgatwet (Tugen)* | WK/02/15/050 | *Bark* | *Crush and add a little water* | *Abdominal pain & diarrhea in infants* |
| 52. | | | *Mborusiat* | WK/02/15/051 | *Bark* | *Chewed raw or dried* | *Common colds, cough* |

http://dx.doi.org/10.4314/ajtcam.v13i3.19

**Table 2:** Classification of Medicinal Plants

| | Plant | Family | Number | % |
|---|---|---|---|---|
| 1. | *Albizia gummifera Entada abyssinica, Erythrina abysinica, Pseudarthria hookeri, Pterolobium stellatum, Senna didymobotrya, Tylosema fassoglensis* | FABACEAE | 7 | 14 |
| 2. | *Ajuga remota, Leucas calostachys Plectranthus barbatus, Plectranthus barbatus var.grandis* | LAMIACEAE | 4 | 8 |
| 3. | *Solanum aculeastrum, Solanum aculeatissimum, Solanum mauritianum, Solanum sessilistellatum* | SOLANACEAE | 4 | 8 |
| 4. | *Carissa edulis, Cascabela thevetia,Periploca linearifolia* | APOCYNACEAE | 3 | 6 |
| 5. | *Artemesia abbysinica, Tithonia diversifolia, Vernonia amygdalina* | ASTERACEAE | 3 | 6 |
| 6. | *Cucumis prophetarum Lagenaria, abyssinica, Momordica foetida* | CUCURBITACEAE | 3 | 6 |
| 7. | *Markhamia acuminate, Markhamia lutea* | BIGNONIACEAE | 2 | 4 |
| 8. | *Dovyalis abyssinica, Flacourtia indica* | FLACOURTIACEAE | 2 | 4 |
| 9. | *Rhamnus prinoides, Ziziphus mucronata* | RHAMNACEAE | 2 | 4 |
| 10. | *Toddalia asiatica, Zanthoxylum gilletii* | RUTACEAE | 2 | 4 |
| 11. | *Hypoestes verticillaris* | ACANTHACEAE | 1 | 2 |
| 12. | *Aloe kedongensis* | ALOACEAE | 1 | 2 |
| 13. | *Ozoroa insignis* | ANACARDIACEAE | 1 | 2 |
| 14. | *Asparagus racemosus* | ASPARAGACEAE | 1 | 2 |
| 15. | *Basella alba* | BASELLACEAE | 1 | 2 |
| 16. | *Commiphora africana* | BURSELACEAE | 1 | 2 |
| 17. | *Combretum collinum* | COMBRETACEAE | 1 | 2 |
| 18. | *Kalanchoe crenata* | CRASSULACEAE | 1 | 2 |
| 19. | *Euclea divinorum* | EBENACEAE | 1 | 2 |
| 20. | *Croton macrostachyus* | EUPHORBIACEAE | 1 | 2 |
| 21. | *Melia azedarach* | MELIACEAE | 1 | 2 |
| 22. | *Ensete ventricosum* | MUSACEAE | 1 | 2 |
| 23. | *Syzygium cordatum* | MYRTACEAE | 1 | 2 |
| 24. | *Clematis simensis* | RANUNCULACEAE | 1 | 2 |
| 25. | *Gardenia volkensii* | RUBIACEAE | 1 | 2 |
| 26. | *Urtica massaica* | URTICACEAE | 1 | 2 |
| 27. | *Rhoicissus tridentata* | VITACEAE | 1 | 2 |
| 28. | *Engleromyces goetzei* | XYLARIACEAE | 1 | 2 |

The plants were used to treat 32 different medical conditions, with the conditions treated by the widest variety of plants being abdominal/colic pains whereby 15(13%) different medicinal plants were used; respiratory disorders 15(13%) and infertility14(12%) respectively **(Table 3).** One plant, *Solanum aculeastrum* was used as talisman, to offer children protection from evil or harm. The most widely used plants were *Vernonia amygdalina* which is used for the treatment of 7(7%) medical conditions, *Toddalia asiatica* 6(6%), *Aloe kedongensis* 5(5%) and *Zanthoxylum gilletii* 5(5%) plants **(Table 4).** The plant families with the highest number of usage were *Fabaceae* 8(14%) plants, *Lamiaceae* 4(8%) and *Solanaceae* 4(8%) plants respectively **(Table 3).**

The medicinal preparations consisted of roots, leaves and bark which were prepared in different ways depending on the intended use just like their Marakwet cousins that we earlier reported (Gabriel Kigen et al., 2014; Kipkore et al., 2014).

http://dx.doi.org/10.4314/ajtcam.v13i3.19

**Table 3:** Conditions treated by the medicinal plants

| | **Condition** | **No of plants used** | **%** |
|---|---|---|---|
| 1. | Abdominal/colic pains | 15 | 13 |
| 2. | Respiratory disorders | 15 | 13 |
| 3. | Infertility | 14 | 12 |
| 4. | Renal disorders | 6 | 5 |
| 5. | Arthritis | 6 | 5 |
| 6. | Cancer | 6 | 5 |
| 7. | Gynecological disorders | 5 | 4 |
| 8. | Splenomegally | 5 | 4 |
| 9. | Diarrhoea | 4 | 3 |
| 10. | Wounds | 4 | 3 |
| 11. | Ring worms | 3 | 3 |
| 12. | Skin conditions | 3 | 3 |
| 13. | Ulcers | 2 | 2 |
| 14. | Emetics | 2 | 2 |
| 15. | Cathartic | 2 | 2 |
| 16. | *"Goroitab ngwony"* | 2 | 2 |
| 17. | Malaria | 2 | 2 |
| 18. | Chicken pox | 2 | 2 |
| 19. | Liver disease | 2 | 2 |
| 20. | Epilepsy | 2 | 2 |
| 21. | Poultice | 2 | 2 |
| 22. | Typhoid | 1 | 1 |
| 23. | Meningitis | 1 | 1 |
| 24. | Dental disorders | 1 | 1 |
| 25. | Measles | 1 | 1 |
| 26. | Oral thrush | 1 | 1 |
| 27. | Mumps | 1 | 1 |
| 28. | Inflammation | 1 | 1 |
| 29. | Sexually transmitted diseases | 1 | 1 |
| 30. | Anaemia | 1 | 1 |
| 31. | Anthrax | 1 | 1 |
| 32. | Talisman | 1 | 1 |
| 33. | Veterinary uses | 2 | 2 |
| | | **117** | |

**Table 4:** Frequency of plant use

| | Plant | Conditions treated (No.) | % |
|---|---|---|---|
| 1. | *Vernonia amygdalina* | 7 | 7 |
| 2. | *Toddalia asiatica* | 6 | 6 |
| 3. | *Aloe kedongensis* | 5 | 5 |
| 4. | *Zanthoxylum gilletii* | 5 | 5 |
| 5. | *Solanum aculeastrum* | 4 | 4 |
| 6. | *Tylosema fassoglensis* | 4 | 4 |
| 7. | *Artemesia abbysinica* | 3 | 3 |
| 8. | *Asparagus racemosus* | 3 | 3 |
| 9. | *Dovyalis abyssinica* | 3 | 3 |
| 10. | *Erythrina abysinica* | 3 | 3 |
| 11. | *Markhamia lutea* | 3 | 3 |
| 12. | *Periploca linearifolia* | 3 | 3 |
| 13. | *Rhamnus prinoides* | 3 | 3 |
| 14. | *Solanum mauritianum* | 3 | 3 |
| 15. | *Solanum sessilistellatum* | 3 | 3 |
| 16. | *"Kipchilgatwet"* | 2 | 2 |
| 17. | *Ajuga remota* | 2 | 2 |
| 18. | *Albizia gummifera* | 2 | 2 |
| 19. | *Basella alba* | 2 | 2 |
| 20. | *Carissa edulis* | 2 | 2 |
| 21. | *Clematis simensis* | 2 | 2 |
| 22. | *Commiphora Africana* | 2 | 2 |
| 23. | *Cucumis prophetarum* | 2 | 2 |
| 24. | *Flacourtia indica* | 2 | 2 |
| 25. | *Kalanchoe crenata* | 2 | 2 |
| 26. | *Markhamia acuminata* | 2 | 2 |
| 27. | *Melia azedarach* | 2 | 2 |
| 28. | *Pterolobium stellatum* | 2 | 2 |
| 29. | *Syzygium cordatum* | 2 | 2 |
| 30. | *Tithonia diversifolia* | 2 | 2 |
| 31. | *"Mborusiat"* | 1 | 1 |
| 32. | *Cascabela thevetia* | 1 | 1 |
| 33. | *Combretum collinum* | 1 | 1 |
| 34. | *Croton macrostachyus* | 1 | 1 |
| 35. | *Engleromyces goetzei* | 1 | 1 |
| 36. | *Ensete ventricosum* | 1 | 1 |
| 37. | *Entada abyssinica* | 1 | 1 |
| 38. | *Euclea divinorum* | 1 | 1 |
| 39. | *Gardenia volkensii* | 1 | 1 |
| 40. | *Hypoestes verticillaris* | 1 | 1 |
| 41. | *Lagenaria abyssinica* | 1 | 1 |
| 42. | *Leucas calostachys* | 1 | 1 |
| 43. | *Momordica foetida* | 1 | 1 |
| 44. | *Ozoroa insignis* | 1 | 1 |
| 45. | *Plectranthus barbatus* | 1 | 1 |

| | | | |
|---|---|---|---|
| 46. | *Plectranthus barbatus var.grandis* | 1 | 1 |
| 47. | *Pseudarthria hookeri* | 1 | 1 |
| 48. | *Rhoicissus tridentata* | 1 | 1 |
| 49. | *Senna didymobotrya* | 1 | 1 |
| 50. | *Solanum aculeatissimum* | 1 | 1 |
| 51. | *Urtica massaica* | 1 | 1 |
| 52. | *Ziziphus mucronata* | 1 | 1 |

**Plant Use**

The details of various medical conditions treated, plants used and treatment methods are outlined below:

**Abdominal/Colic Pains**

A concoction made from the boiled roots of *Carissa edulis* is used to treat abdominal pains. The bark of *Zanthoxylum gilletii* is chewed and boiled for the treatment of abdominal/colic pains. Other preparations include boiled bark of *Ziziphus mucronata,* boiled bark and fruits of *Commiphora Africana,* boiled bark and leaves of *Melia azedarach* and boiled roots and leaves of *Toddalia asiatica*. Milk added to a concoction made from the boiled roots of *Periploca linearifolia* is used to treat abdominal/colic pains in women, whereas a preparation made from the boiled roots of *Aloe kedongensis* is administered to treat abdominal/colic pain in infants ***("Surunda").*** A little water added to the crushed two top leaves of *Plectranthus barbatus* or bark of *"Kipchilgatwet"* may also be used. Other preparations for the management of abdominal pains in infants include boiled roots of *Vernonia amygdalina,* boiled roots and leaves of *Basella alba,* and boiled leaves of *Urtica massaica*.

The leaves of *Ajuga remota* are pressed or crushed and added to a little water to treat abdominal pains in children. A tincture made from the bark of *Erythrina abysinica* may also be used. It is peeled to the yellow part, crushed, a little water added and administered. The same preparation is used to treat chicken pox and infertility in men.

**Ulcers**

The boiled bark of *Markhamia acuminate* is used to treat ulcers. Alterative treatment involves the addition of milk to a concoction made from the boiled roots of *Periploca linearifolia.*

**Diarrhoea**

A concoction made from the boiled roots of *Pseudarthria hookeri* is used to treat abdominal pains accompanied by diarrhoea. The boiled bark of *Syzygium cordatum* is used for the same purpose. Boiled tubers of *Plectranthus barbatus var.grandis* are used to treat diarrhoea and vomiting in infants, whereas the crushed bark of *"Kipchilgatwet"* added to a little water is used to treat diarrhoea, also in infants.

**Typhoid**

A concoction made from the boiled roots of *Vernonia amygdalina* is used.

**Emetics**

The boiled fruits of *Cucumis prophetarum* are used to induce vomiting. Alternatively, some little warm water is added to the crushed bark of *Gardenia volkensii* and administered.

**Cathartic**

The roots of *Euclea divinorum* are used to induce purgation. They are gently warmed over an open flame and chewed, followed by a cup of strong tea. Boiled leaves of *Senna didymobotrya* are also used as cathartics. The concoction is drunk and immediately followed by a cup of strong tea.

**Respiratory Disorders**

The whole of *Engleromyces goetzei,* a parasitic fungi living in Bamboo is boiled and administered to treat respiratory disorders. The pressed leaves and flowers of *Clematis simensis* are inhaled to treat sinusitis, allergy, common colds, cough, wheezing, chest pain

and blocked nose. They may also be dried, ground to powder and inhaled. The raw or dried bark of *"Mborusiat"* and leaves of *Leucas calostachys* are chewed to treat common colds and coughs, whereas powder from the burnt leaves ***("Busaruk")*** are licked for the same purpose. The leaves of *Ajuga remota* are pressed or crushed and added to a little water to relieve coughs in children. The boiled roots of *Aloe kedongensis* as well as bark of *Croton macrostachyus* or *Syzygium cordatum* and boiled roots and leaves of *Toddalia asiatica* may also be used. A concoction made from the boiled roots of *Pterolobium stellatum* is used to treat common colds and persistent coughing and wheezing (asthma). Boiled roots of a total of three *Solanum* species were also recorded for the treatment of respiratory disorders. *Solanum aculeatissimum* is used in treatment of common colds, persistent cough and asthma, *Solanum mauritianum* for persistent cough, asthma and pneumonia; whereas *Solanum aculeastrum* is used in the management of pneumonia in both children and adults.

**"Goroitab Ngwony"**

Leaves and flowers of *Clematis simensis* are used to treat a condition described by herbalists as manifesting as intense headache and nasal congestion, which was described by the medical team to be trigeminal neuralgia, fibromyalgia or sinusitis. The leaves are pressed or dried, ground to powder and inhaled. The leaves and roots *Momordica foetida* are also pressed and inhaled for the treatment of the condition.

**Malaria**

A concoction made from the boiled roots of *Solanum mauritianum* is used. The boiled roots of *Vernonia amygdalina* may also be used.

**Wounds**

The leaves of *Hypoestes verticillaris* are pressed and sap applied on the wound. The sap from the leaves of *Kalanchoe crenata* is also used for anti-infective properties. Alternatively, the latex from *Cascabela thevetia* may be used. It is especially applied on the unhealed navel in babies to prevent infections. The sap from tubers of *Rhoicissus tridentata* is also used to treat wounds, especially open wounds.

**Meningitis**

A concoction made from the boiled roots of *Vernonia amygdalina* is used.

**Dental Disorders**

Juice from *Solanum sessilistellatum* fruits is applied on the affected tooth.

**Chicken Pox**

The infected child is washed with a tincture made from the crushed bark of *Erythrina abysinica.* A concoction made from the boiled bark of *Flacourtia indica* is also used.

**Measles**

A concoction made from the boiled leaves of *Flacourtia indica* is used.

**Oral Thrush**

A concoction from the boiled bark from *Albizia gummifera* bark is administered to treat oral thrush in children.

**Ring Worms**

The roots of *Aloe kedongensis* are boiled and administered. An alternative treatment involves the application of juice from the fruits of *Solanum aculeastrum* or *Solanum sessilistellatum* on the affected areas.

http://dx.doi.org/10.4314/ajtcam.v13i3.19

**Skin Conditions**

The boiled roots of *Aloe kedongensis* are used to treat rashes while juice from *Solanum sessilistellatum* fruits is used to treat rashes, especially in children. The boiled roots of *Markhamia lutea* are used to treat inflammation (swelling) of the skin and muscle pain (myalgia).

**Mumps**

The leaves of *Ozoroa insignis* are chewed and the sap applied on swollen areas applied on affected areas.

**Inflammation**

The bark of *Zanthoxylum gilletii* is chewed and boiled for the treatment of severe inflammation (swelling) of the body and tongue.

**Infertility**

A concoction made from the boiled roots of *Cucumis prophetarum, Ensete ventricosum* or *Rhamnus prinoides* is used to treat infertility in both men and women, while tincture made from the crushed bark of *Erythrina abysinica* is used to treat infertility in men. Milk added to boiled roots of *Periploca linearifolia* as well as boiled roots of *Aloe kedongensis* are used to treat infertility in women. A concoction from the boiled roots of *Asparagus racemosus* combined with those of *Carissa edulis, Dovyalis abyssinica &* boiled tubers of *Tylosema fassoglensis* may also be used. Other regimes include the boiled bark of *Combretum collinum* combined with that of *Entada abyssinica & Tylosema fassoglensis.* Boiled roots and leaves of *Toddalia asiatica* may also be used.

**Gynaecological Disorders**

Boiled roots and leaves of *Toddalia asiatica* are used to treat gynaecologic disorders, including abdominal pains and infertility. A concoction made of boiled roots of *Vernonia amygdalina* is administered in pregnancy to maintain good health. The boiled bark of *Markhamia acuminate* is also used in pregnancy to prevent abdominal pains, bleeding and oedema. A little water is added to the crushed bark of *Albizia gummifera* and administered to treat post-partum bleeding. A concoction made from the boiled leaves of *Artemesia abbysinica* is used to treat heavy bleeding during periods (menorrhagia).

**Sexually Transmitted Diseases (Stds)**

The boiled bark and leaves of *Melia azedarach* are used to treat abdominal pain and STDs.

**Splenomegally**

A preparation made from the boiled roots of either *Dovyalis abyssinica, Pterolobium stellatum, Rhamnus prinoides* or *Solanum mauritianum* is used to treat a condition the herbalists referred to as ***"Chemurmugulel"*** or ***Kipgarasit"*** which our medical team thought it was splenomegally.

**Liver Disease**

A preparation made from the boiled roots of *Solanum aculeastrum* is used to treat liver disorders. The bark of *Zanthoxylum gilletii* is chewed and boiled for the treatment of an enlarged liver (hepatomegally).

**Renal Disorders**

A concoction made from the boiled tubers of *Tylosema fassoglensis* combined with boiled roots of *Dovyalis abyssinica, Carissa edulis* and *Asparagus racemosus* is used to treat kidney disease. The boiled bark and fruits of *Commiphora Africana,* as well as boiled roots and leaves of *Toddalia asiatica* may also be used.

**Anaemia**

A preparation made from the boiled roots and leaves of *Basella alba* is administered to increase the blood count.

**Epilepsy**

A concoction made from the boiled tubers of *Tylosema fassoglensis* is used. The boiled roots of *Vernonia amygdalina* may also be used.

**Arthritis**

A concoction from the boiled roots of *Asparagus racemosus* combined with those of *Carissa edulis, Dovyalis abyssinica* & tubers of *Tylosema fassoglensis* is administered. The boiled roots of *Markhamia lutea* or *Vernonia amygdalina* may also be used.

**Cancer**

A concoction made from the boiled roots of *Asparagus racemosus* combined with those of *Carissa edulis, Dovyalis abyssinica* & tubers of *Tylosema fassoglensis* is administered. The boiled roots of *Rhamnus prinoides*, as well as boiled roots and leaves of *Toddalia asiatica* may also be used.

**Anthrax**

Ground bark and resin of *Zanthoxylum gilletii* is inhaled.

**Poultice**

The leaves of *Kalanchoe crenata* are burnt and the remains are massaged on inflamed/inflamed area to treat muscle pains sprains and related disorders. The burnt leaves of *Tithonia diversifolia* may also be used.

**Talisman**

A preparation made from the boiled roots of *Solanum aculeastrum* is used as talisman, mainly to offer children protection from ill omen. The child is bathed in the concoction to prevent evil or harm caused by people with "bad eyes" (Kipkorir BE et al., 2008; Kipkore et al., 2014).

**Veterinary Uses**

The pound leaves of *Artemesia abbysinica* combined with those of *Tithonia diversifolia* are used to treat diarrohea in chicken and cows.

## Discussion

Herbal medicine is still widely used in Tindiret just like many other rural communities in Kenya. All the herbalists we interviewed had learnt the art from a close relative by word of mouth, mostly parents or grandparents but none of them had documented the plants, even those who had obtained some basic education. In fact, quite a number of herbalists knew the plants only by appearance, but had forgotten the names. We had to rely a lot on the herbalist who accompanied us to identify the local names, sometimes consulting other people who were not even herbalists. This is a worrying trend in Kenya since there is risk of knowledge disappearing due to lack of documentation (Kigen GK et al., 2013). Indeed, we identified three plants (*Artemesia abbysinica, Pseudarthria hookeri & Tithonia diversifolia*) that none of the herbalists could recall the local names.

Some of the herbalists we interviewed tended to have specific specializations. The areas we identified include gynaecological disorders, infertility, epilepsy and children's diseases (paediatrics). We identified most of the conditions treated by herbalists but there were two conditions which were not very clear ***"Goroitab ngwony"*** and ***"Chemurmugulel/Kipgarasit"***. ***"Goroitab ngwony"*** is a condition that was described as presenting with severe headache, blocked nose and sometimes associated with the loss of teeth. From the description, our medical team thought that it was probably trigeminal neuralgia, fibromyalgia or sinusitis. ***"Chemurmugulel/Kipgarasit"*** was described as presenting with enlargement of in the left upper quadrant of the human abdomen. Our medical team arrived at the conclusion that it was splenomegaly which may have been caused by several factors including infectious diseases or malignancy. Like their other Kalenjin counterparts, emesis is used to treat what they regard to be **"malaria"** (Kipkore et al., 2014). We found out that the herbalists thought it is malaria because it presents with nausea and vomiting, sometimes accompanied by low grade fever. The emesis is therefore expected to remove massive build-up of mucus in stomach and chest to throat (phlegm) which may presumably cause pneumonia and therefore accompanying fever, as well as bile which they associate with malaria. The herbs used for this purpose are fruits of ***Cucumis prophetarum*** and bark ***Gardenia volkensii.***

A number of the documented herbal plants have been investigated and found to possess some pharmacological activities similar to those mentioned by the herbalists. These include antitumour effects of *Toddalia asiatica* and *Asparagus racemosus* (Mitra et al., 2012; Vazquez et al., 2012; Praveena et al., 2014; Thangavelu et al., 2015), antibiotic activities of *Cascabela thevetia, Kalanchoe crenata* and

*Melia azedarach* (Khan et al., 2001; Akinsulire et al., 2007; Khan et al., 2008; Sowjanya et al., 2013), antibiotic and antifungal effects of *Solanum aculeastrum* (Koduru et al., 2006; Steenkamp et al., 2007) and control of anaemia by *Basella alba* (Bamidele et al., 2010).

**Conclusion**

The study documents important ethno-medical knowledge on the plants used by herbalists in Tindiret sub-county. Most of the medicinal plants from the various Kenyan communities have not been documented despite the risk of disappearance of the knowledge on traditional medicine. There is therefore need to document these indigenous uses of plants for research and potential development of new drugs.

## Acknowledgements

We wish to thank Mrs Emily Cheruiyot for her assistance in providing valuable information and identification of the medicinal plants.

## References

1. Agnew ADQ (2013). Upland Kenya Wild Flowers and Fern, 3rd edition. Nairobi: Nature Kenya--The East Africa Natural History Society.
2. Akinsulire OR, Aibinu IE, Adenipekun T, Adelowotan T, Odugbemi T (2007). *In vitro* antimicrobial activity of crude extracts from plants *Bryophyllum pinnatum* and *Kalanchoe crenata*. African Journal of Traditional, Complementary, and Alternative Medicines : AJTCAM / African Networks on Ethnomedicines **4**(3)**:** 338-344.
3. Bamidele O, Akinnuga A, Olorunfemi J, Odetola O, Oparaji C, Ezeigbo N (2010). Effects of aqueous extract of *Basella alba* leaves on haematological and biochemical parameters in albino rats. African Journal of Biotechnology **9**(41)**:** 6952-6955.
4. Beentje H, Adamson J, Bhanderi D (1994). Kenya trees, shrubs, and lianas. edn. National Museums of Kenya.
5. Gabriel Kigen, Fatuma Some, John Kibosia, Hillary Rono, Ezekiel Kiprop, Bernard Wanjohi, *et al.* (2014). Ethnomedicinal Plants Traditionally Used by the Keiyo Community in Elgeyo Marakwet County, Kenya. Journal of Biodiversity and Bioprospective Development **1**(3).
6. Heinrich M (2014). Ethnopharmacology: quo vadis? Challenges for the future. Revista Brasileira de Farmacognosia **24:** 99-102.
7. Khan AV, Khan AA, Shukla I (2008). *In vitro* antibacterial potential of *Melia azedarach* crude leaf extracts against some human pathogenic bacterial strains. Ethnobotanical Leaflets **2008**(1)**:** 53.
8. Khan MR, Kihara M, Omoloso AD (2001). Antimicrobial activity of *Horsfieldia helwigii* and *Melia azedarach.* Fitoterapia **72**(4)**:** 423-427.
9. Kigen GK, Ronoh HK, Kipkore WK, JK R (2013). Current trends of Traditional Herbal Medicine Practice in Kenya: A review. African Journal Pharmacology Therapy **2013**. **2**(1): 32-37.
10. Kipkore W, Wanjohi B, Rono H, Kigen G (2014). A study of the medicinal plants used by the Marakwet Community in Kenya. Journal of Ethnobiology and Ethnomedicine **10:** 24.
11. Kipkorir BE, Welbourn F (2008). The Marakwet of Kenya: A Preliminary Study, By B. E. Kipkorir, Frederick Burkewood Welbourn. E.A.L.Bureau. 2008 Chapter 2, pp. 8-14.
12. Koduru S, Grierson DS, Afolayan AJ (2006). Antimicrobial Activity of *Solanum aculeastrum*. Pharmaceutical Biology **44**(4)**:** 283-286.
13. Koehn FE, Carter GT (2005). The evolving role of natural products in drug discovery. Nature reviews. Drug discovery **4**(3)**:** 206-220.
14. Li JW, Vederas JC (2009). Drug discovery and natural products: end of an era or an endless frontier? Science **325**(5937)**:** 161-165.
15. Mitra SK, Prakash NS, Sundaram R (2012). Shatavarins (containing Shatavarin IV) with anticancer activity from the roots of *Asparagus racemosus.* Indian Journal of Pharmacology **44**(6)**:** 732-736.
16. Nandi (2013). Nandi County Integrated Development Plan (2013-2017); http://nandi.go.ke/wp-content/uploads/2015/03/NANDI-COUNTY-CIDP-FINAL-JUNE-18-2014.pdf. Accesed on 24/04/2015.
17. Praveena A, Suriyavathana M (2014). *In Vitro* Cytotoxicity of The Crude Alkaloids Of *Toddalia asiatica*. L. Against The Human Liver Cancer Cell Lines (Hep G2) And Normal Liver Cell Lines (Lo2).
18. Sowjanya K, Narendra K, Swathi J, Satya K (2013). Phytochemical extraction and antimicrobial efficiency of crude leaf extract of medicinal plant, *Cascabela thevetia.* International Journal of Research in Pharmacy and Biomedical Science **4**(2)**:** 465-470.
19. Steenkamp V, Fernandes AC, Van Rensburg CEJ (2007). Screening of Venda medicinal plants for antifungal activity against *Candida albicans.* South African Journal of Botany **73**(2)**:** 256-258.
20. Thangavelu K, Ravisankar N, Siddiq A, Joseph J (2015). *In Vitro* Antioxidant and Anticancer Potential Of Flowers Of *Toddalia asiatica* (Rutaceae). International Journal of Pharmacy and Pharmaceutical Sciences **7**(3).
21. Vazquez R, Riveiro ME, Vermeulen M, Mondillo C, Coombes PH, Crouch NR, Ismail, F., Mulholland, D.A., Baldi, A., Shayo, C., and Davio, C.
(2012). Toddaculin, a natural coumarin from Toddalia asiatica, induces differentiation and apoptosis in U-937 leukemic cells. *Phytomedicine :* International Journal of Phytotherapy and Phytopharmacology **19**(8-9)**:** 737-746.
22. Wikipedia (2013). Nandi County; http://en.wikipedia.org/wiki/Nandi_County. Accesed on 24/04/2015.
23. Wikipedia (2015). Kalenjin people. http://en.wikipedia.org/wiki/Kalenjin_people. Accessed on 24/05/2015.

http://dx.doi.org/10.4314/ajtcam.v13i3.19