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An ethnobotanical study of medicinal plants used by the Masaai people of Losho, Kenya

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Abstract
Objective: An ethnobotanical survey on the medicinal plant species in Losho, Narok County, Kenya was conducted in order to document traditional medicinal knowledge and application of medicinal plants.
Materials and Methods: This study was undertaken between 2012. Information was gathered from traditional practitioners who lived and practised in Losho, Narok County, Kenya using semi-structured questionnaires and personal interviews during field trips. Ethnobotanical data was arranged alphabetically by family name followed by botanical name, vernacular name, part used, folk use, and recipe. Correct identification was made with the help of taxonomist and voucher specimens deposited at the University of Nairobi Herbarium.
Results: Twenty six (26) herbalists between the ages 20-69 years (10 men and 16 women) were purposively selected and interviewed. The present investigation reported medicinal information for 33 species, belonging to 21 plant families. The most represented plant family was Asteraceae followed by Oleaceae and Rhamnaceae. 36 % of the species were used to manage stomach ache and stomach related ailments while 30% of the plant species were used to treat malaria.
Conclusion: This survey showed that although people in study area have access to modern medical facility Losho Dispensary but a lot of them still continue to depend on medicinal plants for the treatment of healthcare problems. The present paper represents significant ethnobotanical information on medical plants which provides baseline data for future pharmacological and phytochemical studies.
Keywords: Ethnobotany, Medicinal Plants, Losho, Narok County, Kenya.

1. Introduction

Traditional medicine is worldwide and the demand for its services is increasing especially with the recognition that we are facing more challenges in the treatment of some medical conditions such as: diabetes and cancer [1]. Synthetic medicines have been derived from plants and recently herbal medicine are preferred to modern medicine in treatment of various minor diseases and infections due to increasing costs of personal health maintenance [2].

Many Communities in Kenya still rely on herbal remedies [3]. 90% of the Kenyan population has used medicinal plants at least once for various health conditions [4].From time immemorial, the Maasai have relied on plants for fuel, wood, rituals, ceremonies, nutrition as well as medicinal substances [5] [6]. In developing countries, a very important aspect of the traditional medicine is the usage of medicinal plants which is attached to the culture of people [7]. Information is still in the hands of traditional herbalist and hence medicinal plants have not been well documented studied and tested [8].Therefore, there is an urgent need to document information on this herbal remedies because there are genuine concerns that this knowledge may be completely lost [3].

Many people in Losho still believe in the potency of herbal medicine, even when they can access modern medicine from Losho Dispensary hence traditional practitioners of Losho, are routinely consulted by community.

The objective of the study was to identify and document plants that are used for management of illness in both males and females. An ethno botanical survey was carried out in Losho, Narok South County to achieve the objective. The plants parts, route of administration, method of preparation, dose and whether the plant was administered as a concoction was also documented.

2. Materials and Methods

2.1 Description of the study area

Losho (Losho) is an area) in Narok South County, Kenya (Africa) with the region font code of Africa/Middle East. It is located at an elevation of 1,884 metres above sea level Its coordinates are 1°34'60" S and 35°28'0" E in DMS

(Degrees Minutes Seconds) or -1.58333 and 35.4667 (in decimal degrees). Its UTM position is YD72 and its Joint Operation Graphics reference is SA36-08.Losho is made of Ntilalo and IIkeldisho enkangs, topography is that of the rolling semi-arid grasslands of the Siana Plains, which are bordered on east and west by rocky, wooded hills (MAO) see map (Fig. 1).

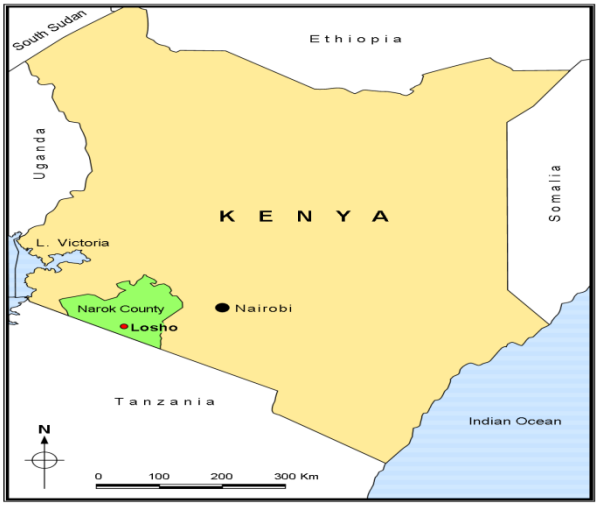

Figure 1: Map of Kenya showing Losho

2.2 Collection of ethnomedicanal data

Ethnomedicinal data was collected in May 2012 from Losho, Narok County Kenya. The ethnomedicinal data were based on structured interviews and purposive questionnaires that sought answers to questions about the human ailments treated, local names of plant species, plant parts used and methods of preparation. Emphasis was on both men and women traditional herbalist and the sampling was intentionally non-random under the assumption that herbalists would provide more specific and higher quality information concerning medicinal plants [10]. In some cases, the interviews were facilitated by translators who were well conversant with the local languages. This was done having first obtained verbal informed consent from each traditional healer. The plant specimens from the traditional healers were collected as herbarium voucher specimens. These were pressed, dried, identified and deposited at the University of Nairobi Herbarium (NAI). Identification of specimens was done using taxonomic keys [11,12] and by comparison with authentic herbarium materials.

2.3 Data analysis

Data of the studied plants was analyzed with Microsoft Office Excel. Frequency of medicinal plants from various families was computed as well as the percentage number of plants used to treat specific ailments. Bar graphs were then plotted to show the most common plant families, most common ailments treated by the plants and the most common plant species used to treat various conditions.

3. Results and Discussion

Many communities in Kenya especially from the poor rural areas still rely on herbal remedies and believe in the potency of herbal medicine even when they can access modern medicine [13]. 21 plant families were represented (Table 1). The most represented plant family was Asteraceae which was in agreement with [14] in the same region, Oleaceae and Rhamnaceae were second highest with 14.2% each. The most common conditions treated by the plants from various families include stomach ache, coughs, venereal diseases, malaria, diarrhoea and chest pains, fever, snake bites and intestinal worms supplementing other studies in the region [14-16]. 18% of the collected plant species were used to treat diarrhoea and chest pains, 30% of the plant species were used to treat malaria. 24% were used to manage coughs while 36 % of the species were used to manage stomach ache and stomach related ailments. On the other hand 27% of the plant species were used to treat venereal diseases and 15 % of the plants were used to manage intestinal worms, fever and snake bites (Table 2). Traditional plant based medicines, which are used to treat and manage various health related problems still remain Maasai's primary health care system with malaria, cough and chest problems, stomachache, sexually transmitted diseases, reduced body vigor and vitality were frequently mentioned as some of the very common ailments [15]. From the above study, both men and women are renowned for their skills in use of herbal remedies and their services are sought whenever a need arises. These skills and knowledge are normally passed on orally from generation to generation [17] and has helped retain and shape a detailed pharmacopoeia among the Maasai. In this study, it was also observed that most of the medicinal plant species were used to treat more than one ailment either singely or as a mixture (Table 3). The use of herbal remedies in mixtures could be due to the additive effects that they may have during treatment [14]

Table 1: Frequency of plant family used in treating illness

	Family	Family Frequency	% Family frequency
1	Euphorbiaceae	2	9.5
2	Celastraceae	1	4.7
3	Compositae	5	23.8
4	Mimosaceae	2	9.5
5	Rhamnaceae	3	14.2
6	Vitaceae	1	4.7
7	Aloaceae	1	4.7
8	Ebenaceae	1	4.7
9	Canellaceae	1	4.7
10	Rutaceae	2	9.5
11	Anacardiaceae	2	9.5
12	Oleaceae	3	14.2
13	Alariaceae	1	4.7
14	Boraginaceae	1	4.7
15	Burseraceae	1	4.7
16	Balanitaceae	1	4.7
17	Capparaceae	1	4.7
18	Papilionaceae	1	4.7
19	Labiatae	1	4.7
20	Rubiaceae	1	4.7
21	Apocynaceae	1	4.7

Table 2: Percentage of species used for treating a given diseases

Disease treated by various plants from different families	Number of Species used for treating the given disease	% number of species used for treating the given disease
Diarrhoea	6	18.1
Headache	4	12.1
Chest pain	6	18.1
Skin diseases	4	12.1
Malaria	10	30.3
Weak joint	3	9.0
Coughs	8	24.2
Stomache ache	12	36.4
Fever	5	15.1
haemorrhagic septicaemia	1	3.0
Branchial pains	2	6.0
Rheumatism	3	9.0
menstrual disorders	1	3.0
Sore throat	4	12.1
hepatitis pleurisy	1	3.0
eye disease	4	12.1
Snake bite	5	15.2
Typhoid	2	6.0
Swollen testacles	1	3.0
Leprosy	2	6.0
Oedema	1	3.0
Brucellosis	1	3.0
Tonsilitis	1	3.0
Mouth sore	2	6.0
Venerial diseases	9	27.2
Epilepsy	1	3.0
Intestinal worms	5	15.2
Aphrodisiac	1	3.0
Influenza	1	3.0
Hepatic disease	2	6.0
Asthma	1	3.0
Purgative	1	3.0
Vertigo	1	3.0
Scabies	1	3.0
Infertility	1	3.0
Hernia	1	3.0

Table 3: Ethnomedicinal data collected from Losho, Narok County Kenya with herbal preparations

Collection number	Scientific name	Maa name	Part Used:	What it most commonly treats:	Preparation/How to Use/Dosage:
DMC/2012/001	*Croton dichogamus*	Olokirding'ai (001)	Root Shavings	Cough, cold	Can boil root shavings, but not necessary, Use one glass of root with one cup of water, Adults and children can use, Use concentrated
DMC/2012/002	*Gymnosporia heterophylla*	Olamurunyai (002)	Root-chest pain	Vitamin tonic	Mix with water, wine (honey beer/traditional Maasai beer) or soup. You can mix it with 001 (Olakirding'ai). This is only for adults. Take a glass every day in a five liter container. Prepared like chai tea. Root-chest pains
DMC/2012/003	*Acacia gerrardii*	Orngwenqwenyi (003)	white part of bark; roots	digestion; stomach ache; Strengthen mother after delivery	Bark: chew the white part of the bark to aid in digestion. Root: Boil whole root and drink liquid to sooth stomach after over-eating.
DMC/2012/004	*Rhamnus staddo*	Orkonkola (004)	whole root; leaves	typhoid; back pain/ joint pain; headache; Increase male's libido	*Typhoid, back pain, joint pain:* whole root infusion, Can be mixed with 001, 002, 003, Not for children, Older people usually use this. *Head Ache:* burn leaves and smell them. *Increase male libido:* Boil roots, drink the soup.
DMC/2012/005	*Cissus rotundifolia*	Ororait (005)	root	baby vitamin, helps babies gain weight	Root infusion, mixed with milk, Babies can start this at five months. Start when babies stop breast feeding. Good for their stomach
DMC/2012/006	*Psiadia punctulata*	Olabaii (006)	Root infusion for brucellosis; Leaves for reducing swelling/bruises	An anti-inflammatory; Brucellosis; reduces swelling; Gonorrhea	root infusion for brucellosis-Mix with 001,002,003,004; Leaves-Heat until liquid comes out, and put on swollen body part or bruise. Not for kids
DMC/2012/007	*Aloe volkensii*	Osuguroi (007)	leaves	pneumonia/chest pain; cough; open wounds; Swelling/joint pains; fever reducer for malaria; Infant fever; Infant cough; Infant stomach ache; Anti-diarrhea infant	Dip leaves in water, use sap to treat pneumonia and can put drops on open wounds. Swelling/joint pains- 1st apply jelly oil, then put leaf on it.
DMC/2012/008	*Tarchonanthus camphoratus*	Osentu(008)	roots	vitamin	roots-boil, drink everyday
DMC/2012/009	*Jasminum fluminense*	Ormekusarge (009)	berry	open wound	Apply berry to open wound, an antibacterial
DMC/2012/010	*Euclea divinorum*	Orkinyei (010)	roots; berries and leaves	cleanses someone if they have had malaria and/or typhoid for a long time: causes diarrhea	*Roots*-put with the goat meat and boil, drink soup if you have had malaria and/or typhoid for a long time. *Berries*-put on wound *Leaves*-burn leaves until they turn black, put on wound.
DMC/2012/011	*Olea europaea*	Olirien (011)	bark	Cold, Malaria-fever	boil bark, take once a day, can mix it with milk
DMC/2012/012	*Rhus natalensis*	Ormisigiyioi (012)	bark	long-term wounds	boil bark and apply to long-term wound. Can be mixed with Olkiloriti. Put on wound twice a day.
DMC2012/013	*Cordia monoica*	Oseki (013)	Leaves	Eye infection	soak leaves in water, until water is green, Put two drops in infected eye 2 times a day

					until eye is better, use the leaf as a dropper
DMC/2012/014	*Acacia nilotica*	Ol'kiloriti (014)	bark; roots	long-term wounds, Firms stool, Typhoid	Bark-boil bark with 012 to treat long-term wounds. Roots- boil, mix with animal oil, drink
DMC/2012/015	*Scutia myrtina*	Osanankurur/ Olmepung'oruo (015)	root; bark	anemia; joint pain	Root-infusion, drink, anaemia. Bark-boil, drink, joint pain
DMC/2012/016	*Gardenia ternifolia*	Oltakuriet (016)	Inside of fruit or Bark Shavings	Malaria and epigastric pain	Fruit: boil inside of fruit (peel shell), drink liquid, one cup a day until you feel better. Bark: shave bark, boil one handful of shavings, drink one cup a day until you feel better. Use fruit one time per day for two days. Then, switch to bark and do same pattern with bark and keep alternating. Bark causes vomiting and diarrhoea. Bark is second choice if fruit does not work.
DMC/2012/017	*Carissa spinarum*	Olamuriaki (017)	Roots	reduces swelling/bruises; Gonorrhea; HIV/AIDS; Pneumonia/Chest Pain	boil roots, mix with goat or sheep fat
DMC/2012/018	*Fuerstia africana*	Oloitadarair (018)	leaves; roots	Energy; Care of infant post partum	leaves: boil, drink a little bit, drink is orange, vomit when have excess, for ages 5+. Roots: boil and drink, care of infant post partum.
DMC/2012/019	*Boscia angustifolia*	Oloireroi (19)	Bark shavings	Stops Diarrhea; Joint Pain, Reduces Swelling/Bruises esp. if there is a thorn	Anti-diarrhea: Boil water, dip the bark shavings in boiled water, when water turns red, drink it. Joint Pain and bruises: boil bark shavings, drink liquid, mix with 015.
DMC/2012/020	*Ximenia americana*	Olamai (20)	Bark	Anemia, Stop infant diarrhea	boil bark drink liquid (cut bark into pieces), can mix with milk), used for children, mothers and new babies
DMC/2012/021	*Ormocarpum trichocarpum*	Enkokisirianchoi (21)	Bark Pieces	stop bleeding during a miscarriage or pregnancy	boil bark pieces for a long time, add sugar to liquid
DMC/2012/022	*Euphorbia candelabrum*	Olpopong'I (22)	roots; bark	open wounds; menstrual cramps	Open wounds: burn the root and use the charcoal end on the wound, dangerous if the white milk gets into your eyes. Menstrual cramps-boil bark and mix with milk, drink.
DMC/2012/023	*Balanites aegyptiaca*	Olgoswa (23)	bark pieces	malaria-fever, headache and epigastric pain	boil bark in pieces, then drink water, Some people may vomit, but it's not used to force vomiting, Children take it diluted
DMC/2012/024	*Commiphora africana*	Orsilalei (24)	root; bark	Brucelosis/back pain/joint pain; Open wounds; Anti-diarrhea for infant	Back/back pain/joint pain: whole root infusion, mix with 004 and 006 and a little sugar. (Use equal parts of each plant), drink one glass every morning until you feel better. Open wounds: boil bark, wash wound with water. Anti-diarrhoea for infant: boil bark shavings mixed with Olamai (20) root, then drink a 1/4 of a cup.
DMC/2012/025	*Ziziphus*	Ololalei (25)	leaf	open wounds; stop	break leaf & use liquid from

	mucronata			bleeding in miscarriage	leaf on open wound
DMC/2012/026	*Vernonia brachycalyx*	Ologumati (26)	leaves or roots	For Vomiting when you have typhoid or malaria; Joint Pain/ Brucellosis/ Back Pain	leaves-boil until water is green, Drink a whole jug to vomit. Roots-boil, drink a cup a day until you feel better
DMC/2012/027	*Cussonia holstii*	Oloiwurur (27)	bark	Energy,ear nose mouth infection	Boil bark, must mix with milk, drink everyday, do not mix with other plants
DMC/2012/028	*Vepris simplicifolia*	Orgilai (28)	leaves; root	Open wounds; Typhoid: clears stool of blood, mucous and diarrhea, firms stool. Works as antacid to clear stomach; Pneumonia: makes pain in ribcage go away. Makes it easier to breathe; Strengthens mother after childbirth	*Leaves:* burn and put black stuff on wounds. *Whole root infusion:* pneumonia and typhoid, one glass in early am. *Strengthens mother after childbirth:* Drink solely hot tea for 2 days then take Orgilai (28) with oil then take tea then you can eat food and mix Orgilai (28) in it. boil*Gonorrhea:* boil roots, mix with sheep fat, let it steep until you are left with 1/4 of what you started with.
DMC/2012/029	*Schrebera alata*	Enchenienkashe (29)	bark	stomach pains, blood in stool and diarrhea, relieves pain from pregnancy, causes diarrhea	Boil bark, then drink, Remove any lichen before boiling. drink a glass a day until you feel better.
DMC/2012/030	*Schinus molle*	Ormitilaya (30)	leaves and root shavings	chicken pox	Boil leaves and shavings, take clothes off, put maasai blanket around you and steam yourself. You can also bathe with the water
DMC/2012/031	*Toddalia asiatica*	Ole-barmunyo (31)	Bark shavings	Fever; cough; digestion; cold; firms stool; malaria; infant cough; infant fever	Remove the bark of the roots and boil the bark.
DMC/2012/032	*Warburgia ugandensis*	Osokenoi (32)	white bark	malaria; clearing blood/mucus from stool; Suppresses stomach pains for woman who have just delivered	malaria: mix it with porridge. Clearing stool: mix with animal fat. Suppresses stomach pains for woman who have just delivered: boil white bark with animal oil and drink
DMC/2012/033	*Helichrysum forskahlii*	Eleleishua-enkop	Whole plant	Toothache, headache, stomachache	Boil the whole plant and drink the decoction

5. Conclusion and Recommendations

Traditional/ indigenous knowledge in context of science and technology is largely ignored and undervalued. Due to loss of information, traditional knowledge needs intensive documentation and to be valued and utilised in the process of sustainable development. There is a lot of potential in Kenyan herbal medicine judging from the published laboratory results from the screening of the plant exudates that have been analysed in our various institutions.

It is also recommended that phytochemical screening and bioactivity studies should be conducted on the reported medicinal plants to determine the efficacy for possible drug development.

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