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ORIGINAL ARTICLE

Herbal Materials Used in Management of Oral Conditions in Nairobi, Kenya

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ABSTRACT

Aim: This study was carried out to document the medicinal plants used in management of oral health and diseases by traditional medical practitioners in Nairobi County, Kenya.

Methods: An ethnomedicinal survey was conducted using a standard questionnaire and informal discussion to collect information from traditional medical practitioners, traders and vendors of medicinal plants used in oral care practice.

Results: This study identified 35 species from 24 families, commonly used by the traditional medical practitioners in Nairobi to manage oral health and diseases in Nairobi County.
Conclusion; There are various plants that are used by traditional medical practitioners to manage oral diseases either singly or in combination.

Keywords: Medicinal plants, Traditional knowledge, Oral hygiene, Oral diseases, Nairobi County.

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INTRODUCTION

Alternative medicine is used by 80% of population in developing countries to treat a variety of illnesses including management of oral health (1). Oral diseases include dental caries, periodontal diseases, tooth loss, oral mucosal lesions, oropharyngeal cancers, gingivitis, toothache, mouth ulcers and gum bleeding.

The need for alternative, prevention and treatment options and products for oral infection that are safe, effective and affordable comes from rise in disease incidence and financial constraints in developing countries (2). In most developing countries, government expenditure in oral health care is low and access to dental care limited (3). In Kenya, the oral health facilities and infrastructure in existing health centres do not have sufficient resources (4).

During oral health care, herbs are used in various forms like toothbrush sticks, powders, oils, pastes, solutions and in combinations. However the herbs and their combinations used in these formulations remain undocumented. Documentation of the medicinal use of African plants is becoming increasingly urgent because of the rapid loss of natural habitats due to anthropogenic activities (5).The objective of this study was to document plants that are used in the management of oral diseases, in Nairobi County, Kenya.

MATERIALS AND METHODS

General ethnobotanical methods were used to gather information on medicinal plants and herbal materials used in management of oral health. Stratified random sampling was carried out to pick traditional medical practitioners (TMPs), traders and markets where sampling was carried out. Interviews using a questionnaire and informal discussions were held with 60 informants, 19 traders of herbal materials, 30 TMPs and 3 vendors in herbal clinics, distributed in various parts of Nairobi. In some cases study participants were

accompanied in their plant collecting expeditions. Where the respondents were uncomfortable with the questionnaires, discussions and informal interviews were undertaken and in the process information on traditional management of oral health obtained. During discussions, information on blending of herbal materials for management of oral health was noted and recorded. Any use of none plant remedies for management of oral infections was also recorded.

Plants cited as useful in managing various oral ailments during the interviews were collected in duplicates using standard taxonomic and ethnobotanical procedures. The voucher specimens were dried in the herbarium and then mounted on sheets. The collected plant materials were identified at Kenyatta University. Preserved specimens were deposited at Technical University of Kenya herbarium, Nairobi.

RESULTS

A total of 35 plant species distributed in 24 families (Table 1) were identified as being used in preparation of herbal materials and herbal products. The family with the highest number of plants was Solanaceae 14.72%, followed

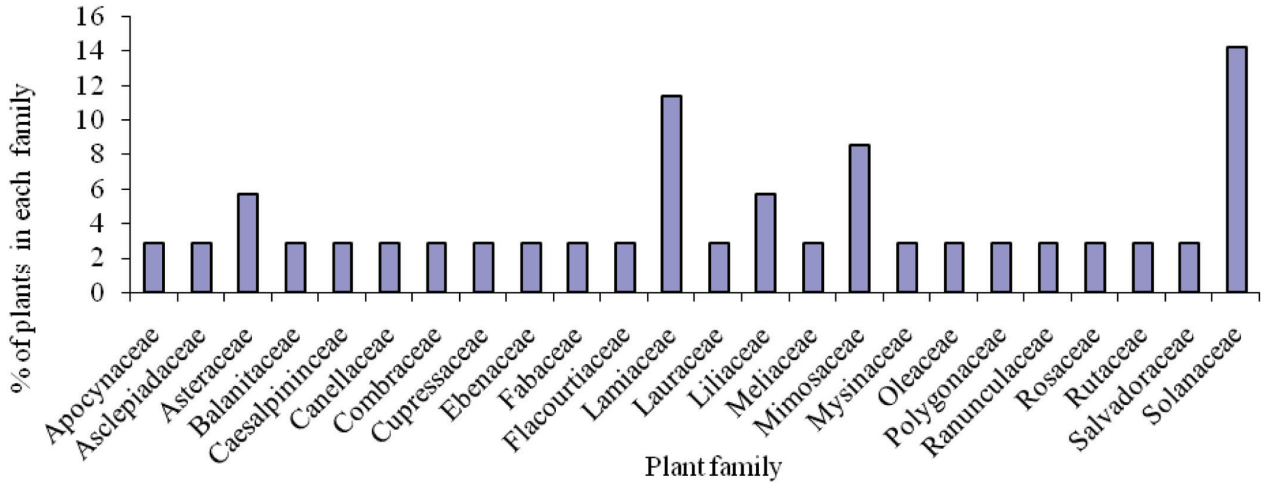

Figure 1. Proportions of plants by families used in oral health in Nairobi, Kenya

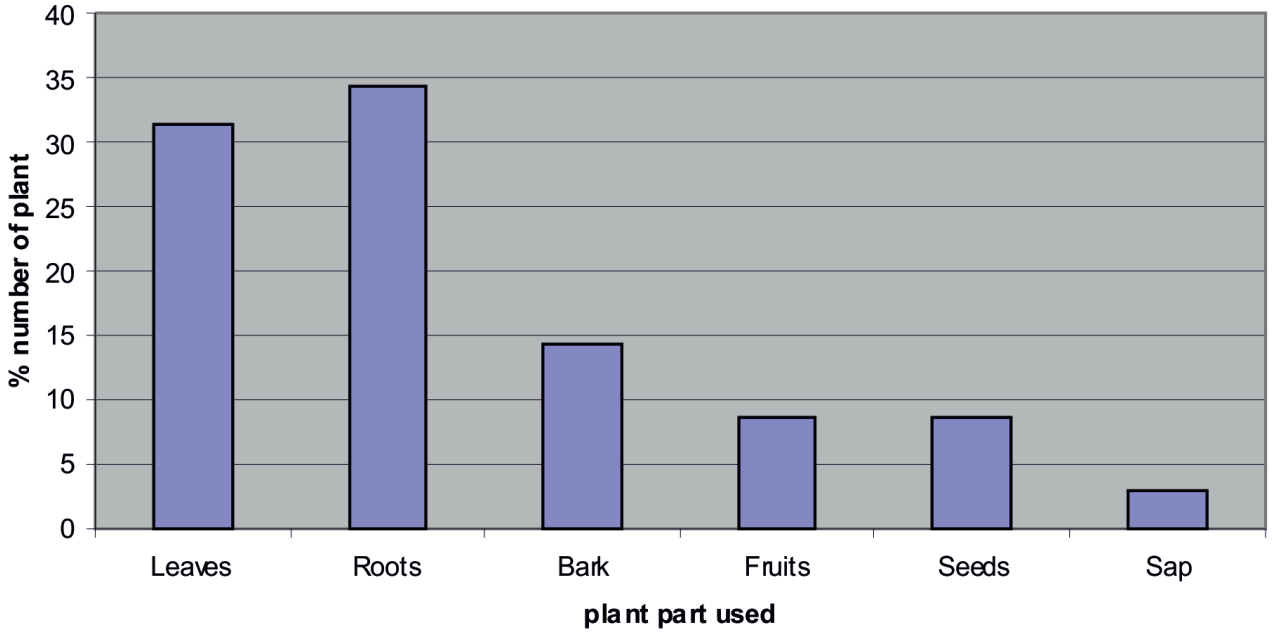

Figure 2 Plant parts used for management of oral health in Nairobi, Kenya

Table 1. A checklists of medicinal plants used in management of oral health

FAMILY	Plant species	Local name	Part used	Medicinal use	Mode of use
APOCYNACEAE	Carisa edulis (Forssk)Vahl	Mukawa	Root	Tooth ache	Chew
ASCLEPIADACEAE	Mondia whtyei (Hook.f.) Skeels	Mukombero	Root	Tooth ache	Chew
BALANITACEAE	Balanites aegyptiaca (L.) Del.	Muhugu	Bark, root	Mouth ulcers	Boil a handful of powder and drink
CAESALPININCEAE	Senna didymobotrya Fressen	Mwenu	Leaf and Root	mouth ulcers	Boil handful of the powder and drink
CANELLACEAE	Warbugia ugandensis Sprague	Muthiga	Bark	Tooth ache	Tooth brush. Applied together with other plants (Table 2) in combinations
COMBRACEAE	Terminalia brownii Fressen	Muuku	Root powder	Tooth ache, tonsillitis	Combined with other plants
COMPOSATAE	Bidens pilosa L.	Muchege	Leaf	Mouth ulcers	Chew
COMPOSATAE	Tagetes minuta L.	Mubangi	Leaf	Tooth ache	Leaves are chewed and directed on aching tooth
CUPRESSACEAE	Juniperus procera Endl.	Mutarakwa	Bark, stem	Gum bleeding	A spoonful of charcoal is applied on gums and teeth
EBENACEAE	Euclea divinorum Hien	Mukinyii	Root	Gum bleeding	Chewing root, apply dried powder on the tooth or gum
FABACEAE	Medicago sativa L.	Lucern	Leaf	Tonsillitis	Mixed with 3 other plants to make capsules (Table 2)
FLACOURTIACEAE	Dovyalis abyssinica (A. Rich) Warb	Mukambura	Root	Tonsillitis	Boil a handful of dried roots and drink
LAMIACEAE	Ajuga remota Benth	Wanjiru wa Kieni	Leaf	Mouth ulcers	Chew
LAMIACEAE	Mentha piperita L.	Mint	Leaf	Gum bleeding	Combined with other plants (Table2)
LAMIACEAE	Plectranthus barbatus L' Herit	Muigoya	Stem	Mouth ulcers	Chew the stems
LAMIACEAE	Rosemarinus officinalis L.	Rosemary	Leaf	Bad mouth breadth	Used with five other herbs to make mouth gurgles and pastes (Table 2)
LAURACEAE	Persea americana Mill.	Avocado	Seed	Tooth ache	Mixed with W. ugandensis bark powder and apply on the tooth
LILIACEAE	Aloe secundiflora Engler	Kiruma	Leaf	Mouth ulcers	Apply on aches
LILIACEAE	Aloe vera	Kiruma	Leaf sap	Mouth ulcers, aches	Used to make tooth paste
MELIACEAE	Azadirachta indica A. Juss	Muarumabaine	Leaf	Tonsillitis	Combine with other three herbs (Table 2)
MIMOSACEAE	Acacia nilotica (L.) Del	Murui	Root	Gum bleeding	Chew
MIMOSACEAE	Acacia seyal Del	Muruai	Bark	Gum	Chew
MIMOSACEAE	Acacia xanthophloea Benth.	Murera	Stem	Tooth cleaning	Tooth brush
MYSINACEAE	Myrsine africana L.	Mugaita	Seed	Bad mouth breath	Powdered seeds are put in glass of water and drunk
OLEACEAE	Olea europaea L.	Mutero	Stem	Mouth cleaning	Chew
POLYGONACEAE	Rumex usambarensis (Damm.) Damm	Mugagatio	Leaf	Tonsillitis	Powder is mixed with powders from other five herbs for mouth ulcers and tonsillitis
RANUNCULACEAE	Clematis hirsuta Guillemin and Per	Mugaya Ngundu	Root	Tooth ache	Chew
ROSACEAE	Prunus Africana (Hook.f.) Kalkam	Muiri	Bark	Tooth sensitivity	Apply powder
RUTACEAE	Zanthoxylum chalybeum	Muguchwa	Root	Tooth ache, gum problem, tonsillitis	Apply powder
SALVADORACEAE	S. persica L.	Mswaki	Stem, root	Cleaning of mouth	Chewing sticks, water extracts used in combination with other herbs to make mouth washes (Table 2)
SOLANACEAE	Capsicum annuum L.	Pepper	Fruit	Mouth ulcers	The powder of dried leaves is mixed with other plants (Table 2). A pinch of the powder is put in glass of water and drunk
SOLANACEAE cavity	Datura stramonium L.	Mugurukia	Seed	Tooth ache	Apply a drop of Cold infusion in tooth
SOLANACEAE	Solanum aculeastrum Dunal	Mutura	Fruit	Tooth ache	Chew the roots, fruit are burnt and mouth smoked
SOLANACEAE	Solanum incanum L.	Mutongu	Fruit, root	Tooth ache	Apply juices on tooth
SOLANACEAE	Withania somnifera (L.) Dunal	Murumbae	Leaf	Bad mouth odour, tonsillitis	Used in making powders

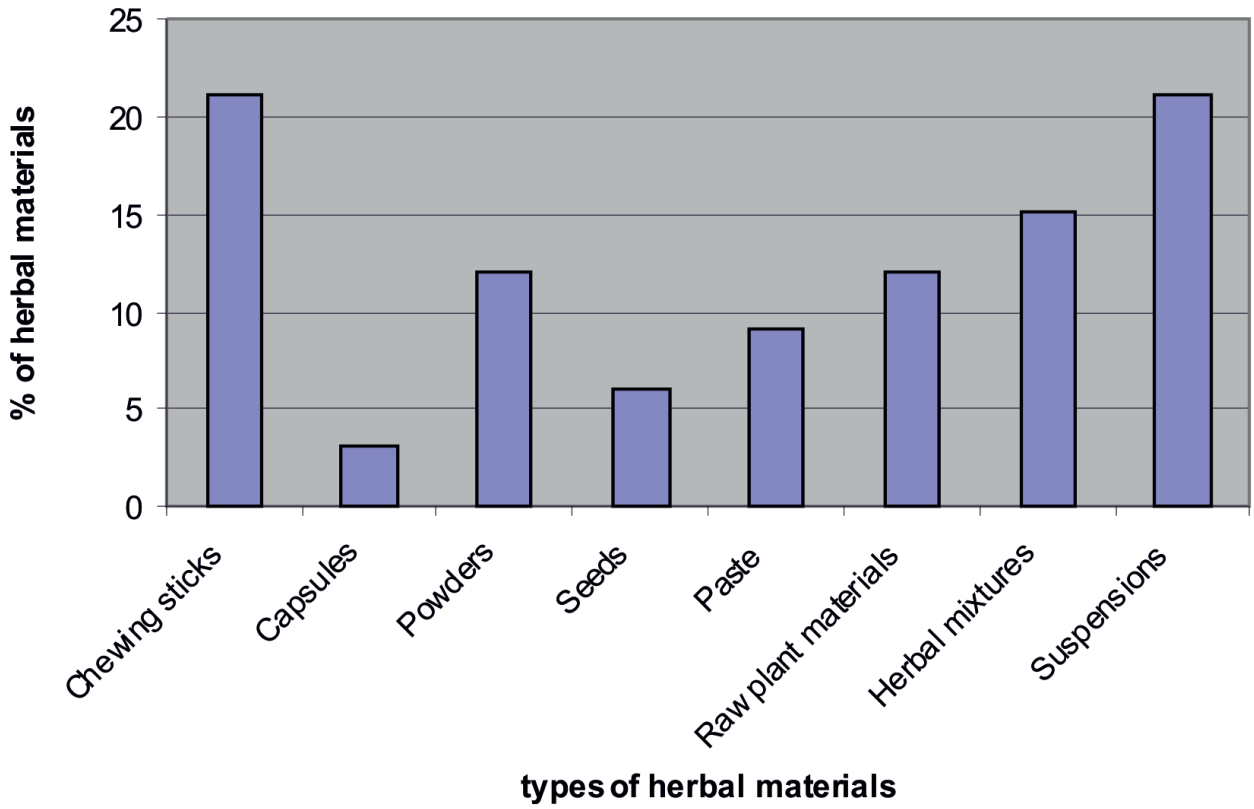

Figure 3 Types of herbal materials and products used in management of oral health in Nairobi, Kenya

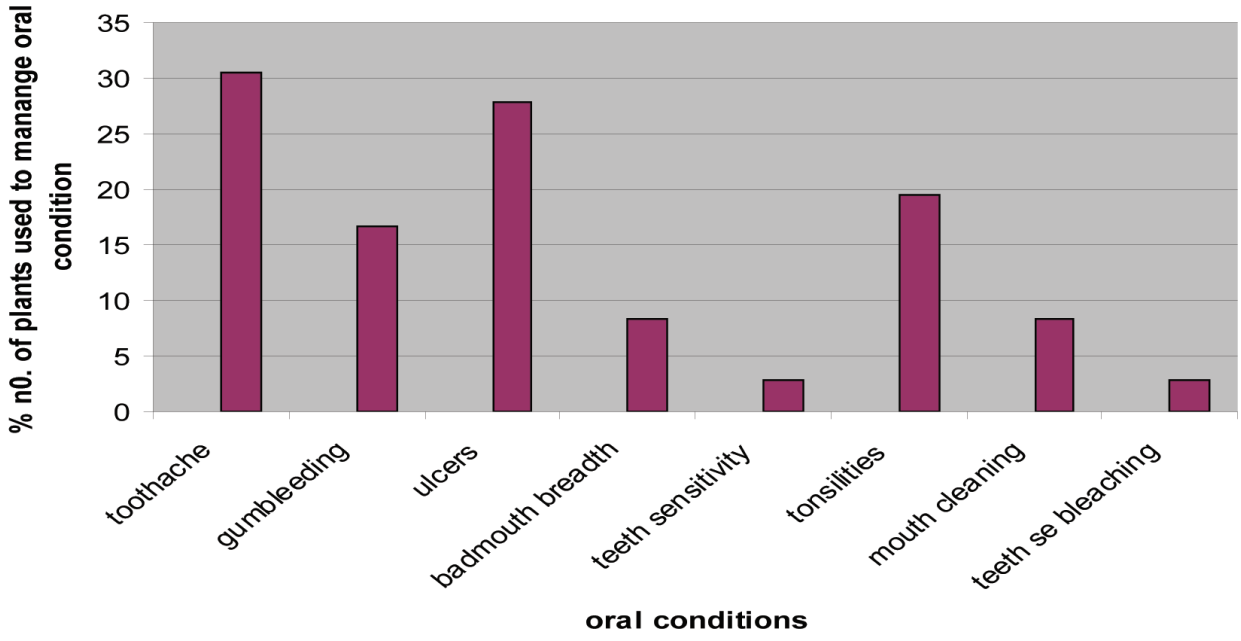

Figure 4. Oral diseases managed using herbal materials in Nairobi, Kenya

Table 2. Herbal materials and their preparations

Product	Formulations	Ingredients	Medicinal use	Dosage
I	Capsules	W. ugandensis bark, M. sativa leaves, R. usamaberensis, Zanthoxylum chalybeum	Tonsillitis	1x3 daily
2	Powder	W. ugandensis, Terminalia brownii , R. usambarensis	Gum bleeding	Mix a tee spoonful of each powder in a glass of milk or water. Drink twice a day
3	Powder	W. ugandensis, A. indica, T. brownii,	Tonsillitis	Mix a tea spoonful in glass of water
		Z. chalybeum		
4	Powder	C. annuum W. ugandensis, iodine,	Mouth ulcers,	Put a pinch in glass of water and drink
		black charcoal	gum bleeding	
5	Powder	J. procera, E. divinorum roots, C. edulis roots	Mouth ulcers	Place the powder in the mouth or put in water and drink
6	Paste	Aloe vera gel, silica	Kills bacteria	Use to clean teeth
7	Paste	S. aromaticum oil, R. officinalis, M. spicata, Cinnamomum cassia, diatomite	Kills bacteria	Use to clean teeth
8	Suspension	W. ugandensis bark, Withania sominfera species, Zanthoxylum chalybeum	Antibacterial, heals ulcers	Gurgle and spit
9	Suspension	Aloe vera gel, W. sominifera	Mouth ulcers, gum bleeding, bad mouth odour	Gurgle and spit
10	Suspension	W. ugandensis, C. annuum ungeral	Mouth ulcers	Gurgle and spit
12	Suspension	Herbal oils (clove oil)	Pain killer, antibacterial	Place a drop on the ailing tooth

by Laminaceae 11.4%, Mimimosaceae 8.6 % while Lilicea and Asteraceae had 5.7% each (Fig 1). All the other families had one plant each (Fig. 1).

Various plant parts are used (Fig 2) for management of oral health, roots are the parts that are highly utilized (34.28 %), followed by leaves (31.4%), bark (14.3%), fruits (8.6 %) and seeds (8.6 %) while plant sap was least utilised at 2.8%. The herbs were used in different forms such as chewing sticks, herbal pastes, herbal powders, capsules, suspensions, saps, mixtures, or just unprocessed materials (Fig.3). Most of herbal materials were used in management of tooth ache (30.5%) (Fig.4) followed by mouth ulcers (27%).

Mouth gurgles were made from plant extracts such as Warbugia ugandensis, Mentha piperita, Terminalia brownii, Aloe vera and Withania somnifera. Three plant species, Aloe species, W. ugandensis and Rosemarinus officinalis are incorporated in the preparation of herbal tooth paste. Very few studies have so far recorded the use of different plants in combinations to prepare herbal materials. Herbal capsules are prepared by mixing powders of W. ugandensis, Medicago sativa leaves, T. brownii roots, R. usambarensis leaves powder and Z. chalybeum root powder (Table 2). The capsules are used in management of tonsillitis associated with bad mouth odour. Another remedy for tonsillitis is obtained by dissolving powders of equal portions from W. ugandensis bark with T. brownii and A. indica in a glass of water or milk. The management of Candida albicans infection is done by use of 3-7 different plants species that are burnt and the resulting charcoal mixture is made into a fine powder. The powder is placed in the mouth for a few minutes or dissolved in water and drunk. Capsicum annuum, M. piperita, W. ugandensis and W. somnifera species are used in formulation of a powder that is used in management of stomach and mouth ulcers.

DISCUSSION

The results of this investigation show that a large number of plants are traditionally used in management of oral health. Most of the plant species reported in this study have been investigated for their pharmacological activities and their related ethnomedicinal values cited in previous studies. Carisa edulis that is used to relieve tooth ache is reported to manage arthritis, typhoid, ulcers and diarrhoea by the Nandis of Kenya (6). These uses demonstrate some antimicrobial as well as analgesics properties of C. edulis justifying it to be useful as a pain killer. Pharmacological studies on B. aegyptiaca indicate its strong anti candidial activity (7) a major cause of ulceration in immuno compromised individuals. This probably explains why the species is appropriate for management of mouth ulcers. Senna. didymobotrya has strong antimicrobial properties (8) and probably it is for this attribute that the plant is used in the management of oral ulcers.

Tooth ache and mouth ulcers are the conditions frequently treated by herbalists using several herbal materials. In most cases, the herbal materials are chewed when raw without prior cleaning. This raises health concerns as these plant are harvested or packaged under unhygienic conditions. Among them are T. minuta, C. hirsuta, S. incanum roots and fruits. Several authors have recorded W. ugandensis as a useful pain killer in tooth ache. Kokwaro (9) reports that dried bark of W.ugandensis is chewed and juice swallowed as a remedy for tooth ache, cough and general body pains. Studies have recorded S. incanum species as useful for tooth ache management (10). The fruits of D. stramonium are used for tooth ache, tonsillitis and sore throat while leaves are smoked to treat headache (11). This agrees well with current study where seeds are powered and small amount is delivered to the tooth cavity. Alternatively the plant is burned and smoke is sucked into the mouth. This plant is reported to be highly poisonous by other authors and therefore further investigation on safe dosage, need to be carried out. The analgesic properties of A. remota have been reported (12) ,justifying its use as anti mouth ulcer.

One of the plants mentioned for managing ulcer of oral cavity is B. pilosa. This is probably due to the anti-ulcerogenic properties and antimicrobial properties of this plant as reported by Geissberger and Sequin (13). The study of A. secundiflora on C. albicans revealed complete inhibition on solid media (14). Candida albicans is the commonest cause of opportunistic infection in oral cavity especially in immune compromised individuals.

Euclea divinorum and S. persica stems and roots were found to be the most common sources of chewing sticks. Antiperiodontopathic bacterial activity of E. divinorum has been reported (15) and S. persica have shown antimicrobial activity against oral bacteria (16). In agro forestry data base the root decoctions of E. divinorum are used by Zulu for management of tooth ache.

Plant species are either used as a single entity or in combination. The current study agrees with previous research where three plants documented in this study viz. T. brownii, Z. chalybeum and W. ugandensis are used in combinations. In Uganda, the herbalists normally combine Z. chalybeum and W. ugandensis in the formulations of herbal products that are used in wound management (17). The Embu people combine T.brownii with other plants to manage various conditions (18).

Most of the plants that are included in herbal formulations have shown antimicrobial or anti-inflammatory properties. Research indicates that M. sativa contains anti-inflammatory and antimicrobial properties (19). Persea americana has been reported to have wound healing properties (20).The antimicrobial properties of M. piperita plant against E. coli, S. aureas and C. albicans has been demonstrated (21). Withania somnifera is a commonly used herb in Ayurvedic medicine and it is an ingredient in many formulations to treat a variety of muscular skeletal pains (22).

One of the major shortcomings of herbal materials and products used by TMPs is lack of standardization (23) Most of the suspensions encountered in the study area had no expiry date and lacked Kenya Bureau of Standards mark of quality. Furthermore, many of these products were not properly labeled and do not contain an insert to explain the composition relevant to the product. The study found that inadequate labeling was common, those products that had labels lacked vital information such as extractive method, dosage, active ingredients, storage conditions, shelf life and precautions.

CONCLUSION

Some plant species reported in this study have been investigated for their phytoconstituents and pharmacological activities individually. The current studies are in agreement with the ethnobotanical uses reported. The study shows that there is a lot of traditional knowledge that has not been recorded and tapped. Safety and antimicrobial properties of the documented herbal materials and products are currently under investigation.

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