Chauke et al., Afr J Tradit Complement Altern Med. (2015) 12(3):9-26
http://dx.doi.org/10.4314/ajtcam.v12i3.2

MEDICINAL PLANT USE OF VILLAGERS IN THE MOPANI DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA

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Abstract

Background: An ethno-medical survey of plants was conducted at Mashishimale village near Phalaborwa, in Limpopo Province (South Africa). Owing to high level of poverty and lack of proper daily operational healthcare facilities in certain parts of Mashishimale village, the use of plants as medicine persists. The aim of the study was to compile a list of medicinal plants used by traditional health practitioners for treatment of diabetes mellitus and other ailments.
Materials and methods: Traditional health practitioners were identified using the snowballing sampling technique. Structured interviews were conducted and a list of medicinal plants compiled. Data collection included local names of the plants, the plant parts used in the traditional medicine, the disease treated by the plant-based remedies and the method of preparation of the medicines.
Results and discussion: A total of 49 plants species belonging to 20 different families we identified. Plant parts used in preparation of remedies by practitioners are roots (51%), stem barks (30%) and leaves (19%). The most preferred methods of administration were boiling (74%) and infusion (12%). About 14 plants species were indicated for treatment of diabetes mellitus, while most plant species were indicated for sexually transmitted diseases, fertility and erectile dysfunction.
Conclusion: The results of the survey indicate that plants play a significant role in primary healthcare of the community of Mashishimale Village. It would seem that a number of major diseases/ailments are treated by traditional methods. Scientific investigation is therefore needed to isolate active compounds and to determine safe dosages for treatment. These studies may guide the regulation of herbal medicine industry in South Africa.

Key words: Ethnobotanical, Medicinal plants, Mashishimale village

Introduction

Reviews of literature involving research of medicinal plants suggest that scientists follow more or less the same general strategy to investigate plant materials for their healing properties (Jones et al., 2006; Kinghorn & Balandrin, 1993; Heinrich, 2003). This general strategy includes bioprospecting and selection of plant material; collection and identification of plant material; extraction of the plant material; screening the extract for healing potential; isolation of active compounds; characterisation and structure elucidation of isolated compounds and preclinical evaluation of the active ingredients or crude extract.

Plant selection for phytotherapeutic studies can be based on specific traditional use of certain medicinal plants (Harborne, 1998) or the chemotaxanomical data (Heinrich, 2003) or a combination of the two approaches. Another approach is use of literature database. The aim of this section of the study was to investigate and identify plant species used in preparation of medicinal remedies by traditional healers of Mashishimale Village in Phalaborwa, Limpopo.

Studies of ethnomedical uses of plants are important contributors to the discovery of new pharmaceutical drugs (Patwardhan, 2005). Despite the fact that 25% of modern drugs are phytochemical in nature or modelled around phytochemicals (Sofowora, 1996; Harvey, 2008), many areas have not been reached for inventory of medicinal plants. Some of these areas may be harbouring important sources of medicines for future generations. The area (Mashishimale village in the Mopani District, Limpopo) under study is no exception, as the authors have not encountered any report on medicinal plant uses by its inhabitants. However, ethnomedical studies were conducted in certain parts of the Limpopo Province (Semenya et al., 2012; Semenya and Maroyi, 2012). These studies focused on the Waterberg, Capricorn and Sekhukhune districts of the Limpopo Province. These districts differ from the Mopani District on the cultural groups inhabiting the respective district, vegetation and climates.

The study focused on medicinal plant species used by traditional healers of Mashishimale village near Phalaborwa (Limpopo province, South Africa). The village is situated about ±15 km west/south-west of the town of Phalaborwa (Fig. 1). The village is composed of several smaller sections (sub places), with a total estimated population of 13920 in a 13.35 km^2 (Census, 2011). The dominant cultures of the village Pedi (86%) and Shangaan (Tsonga) (8%). The ethnobotanical and ethnomedical uses of plants by native cultures of this area have received little scientific research interest. The participants were mostly Pedi speaking, and they were selected from the Tshubje section of the village, using a snowballing method.

Phalaborwa has one the highest winter temperatures (9 – 25^oC) in South Africa, with low average rainfall. Summer temperatures range between 20 and 33^oC, and may occasionally rise over 40^oC (Bing Weather", accessed 6 June 2014). The study was approved by the Tshwane University of Technology's Research Ethics Committee REC2012/01/003/ChaukeMA).

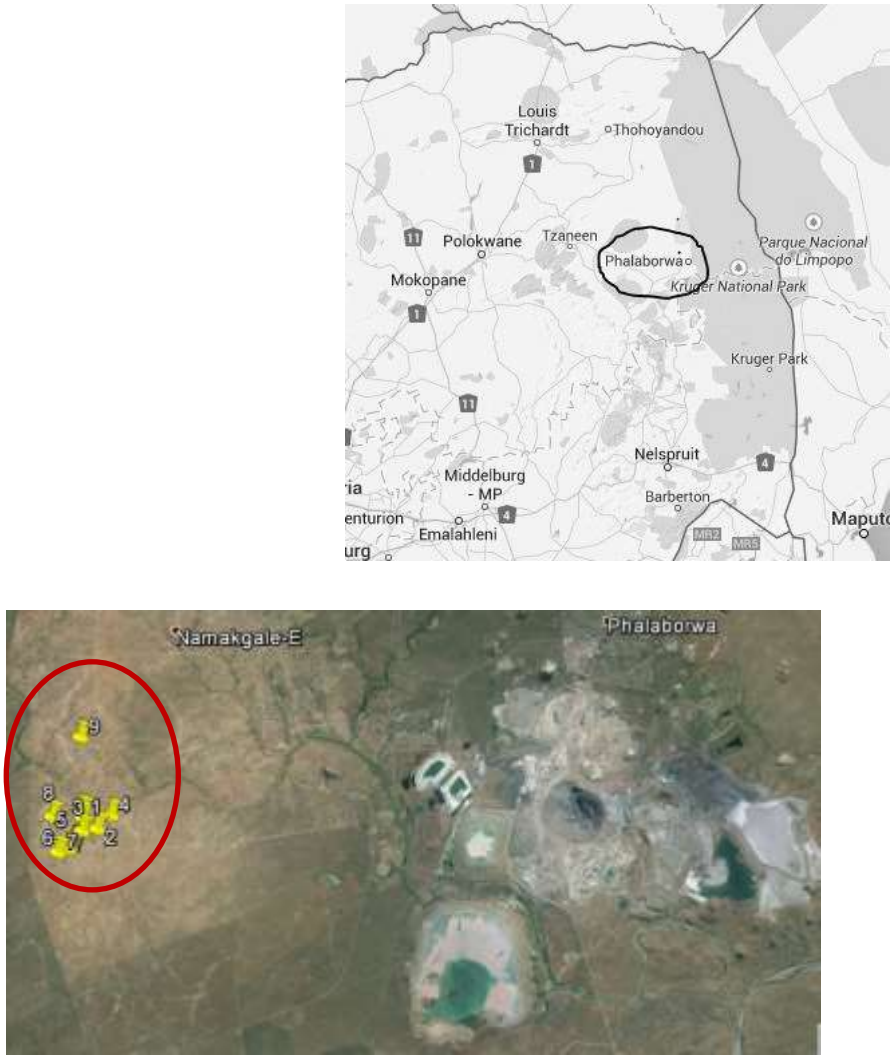

Figure 1: The area under study. Mashishimale is situated near the town of Phalaborwa, on the north-eastern part of the Limpopo province of South Africa. The town is one of the major copper mining towns in South Africa.

Materials and Methods

Interviews

Traditional healers were identified using the snowballing sampling technique. Structured interviews were conducted with traditional healers in order to compile a list of medicinal plants used to treat diabetes mellitus and other diseases. Participation in the interviews was voluntary and respondents verbally consented to participate in the study. Interviews were conducted in two local languages, viz. Xitsonga and Sepedi. Data collection included local names of the plants, the parts of the plant used, medicinal uses of the plants and the method of herbal preparation. Frequency, in the context of this study, was an illustration of the number of times each plant was mentioned as an ingredient in traditional preparations to treat a specific disease.

Plant collection and storage

Plant materials were collected during March 2012 and March 2013. Plant species were grouped on the basis of the disease treated. Herbarium samples were pressed in a herbarium press for two weeks and voucher specimens deposited at H.G.W.J. Schweickerdt Herbarium at the University of Pretoria for identification. Each deposited herbarium specimen was given a unique identification number. The International Plant Names Index (IPNI) was used to verify all the scientific names and families.

Results and Discussion

Data was collected from traditional healers (*dingaka-tshupswa)* and traditional doctors (*dingaka*). In the context of this report, traditional healers have learnt of the uses of medicinal plants from friends and family, through knowledge passed down orally. Some of them have worked with traditional healers and doctors. Traditional doctors, on the other hand, have been formally trained by another traditional doctor,

http://dx.doi.org/10.4314/ajtcam.v12i3.2

leading to their graduation as doctors (*mathwasana*). They combine spirituality with the practice of herbal medicine. Twenty four healers were interviewed, seven of whom were traditional doctors and seventeen healers. Of the twenty four interviewed only fifteen agreed to give the information while the rest refused. Collecting information from most healers was difficult as some of them expected payment while others thought giving information may lead to loss of income, competition in their trade and disrespect to the traditional beliefs and their ancestors. It is claimed that disseminating information about the healing powers of a plant remedy to investigators and even the patients may result in the medicine losing its power. Many of the healers indicated their knowledge of the medicinal uses of plants and the preparation of traditional concoctions was passed down from their parents and grandparents. The interviews also established that the parts of the plant used for preparations of the infusions are the aerial (leaves, stems, stem bark) and underground (roots). Figure 2 is an example of a traditional medicine preparation for treating infertility in women. The medicinal plants are used mostly as mixtures. About 51% of the medicines prepared for treatment of a variety of diseases are derived from roots of plants (Fig. 3). Leaves are the least preferred sources of medicines in this community.

Figure 2: An example of a traditional medicine preparation. This is a mixture used to treat fertility in women. It contains *Aloe spp* and a root of an unidentified plant.

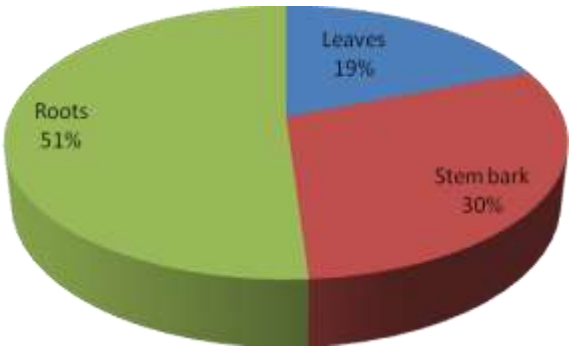

Figure 3: Part of plant used for treatment

The methods of preparation are outlined on Fig. 4. Decoctions are the most preferred method of preparation by the healers. The plant material is boiled in water for certain periods and the concoction administered orally to patients.

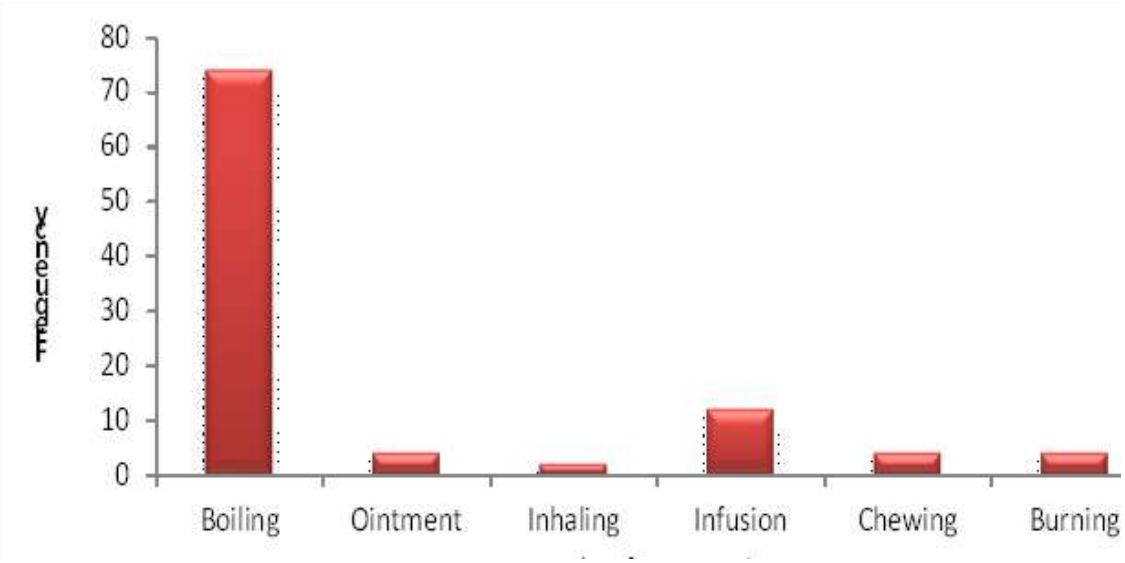

Figure 4: Mode of preparation of plant species

Plants used for diabetes mellitus treatment

Many of the healers had an understanding of diabetes mellitus and indicated plant species used for treatment of the disease. A total of fourteen species were mentioned for treatment of diabetes mellitus, with *Aloe* species and *Mormodica balsamina* being the main ingredients of the remedies administered to patients. *Mormodica balsamina* is also used as a vegetable by the local people. Aloe sp. and *Momordica balsamina* have been previously studied and reported to possess some antidiabetic activity (Hassan et al., 2006). Other plant species listed for management of diabetes mellitus were *Cassia abbreviata, Opuntia ficus-indica, Tinospora fragosa* and *Grewia villosa* (Fig. 5 and Table 1).

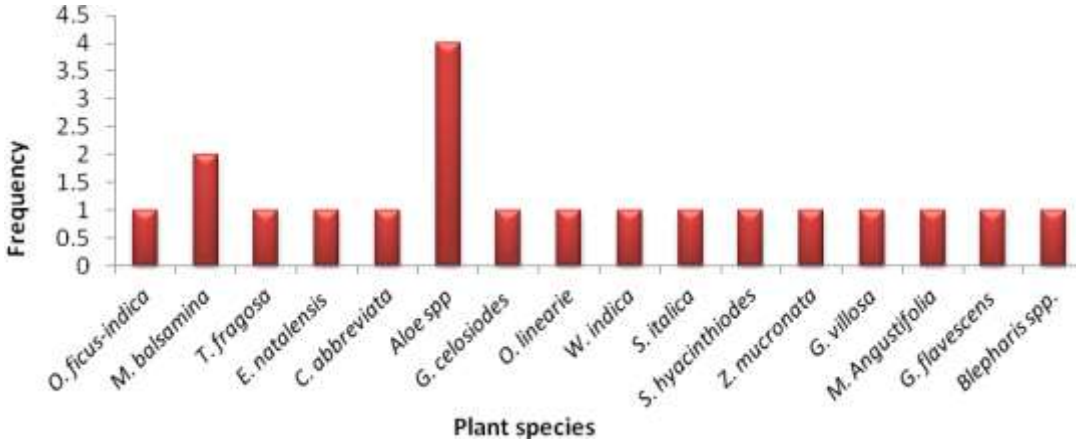

Figure 5: Plants used for treatment of Diabetes mellitus

Plants used for sexually transmitted diseases

The treatment of sexually transmitted diseases was a speciality of healers at the area studied. A total of nineteen plant species were mentioned for sexually transmitted diseases. Different species of *Aloe* as well as *Senna italica, Helinus intergrifolius, Ximenia caffra* and *Tinospora fragosa* (Fig. 6 and Table 2) were the main ingredients in traditional medicine preparations for sexually transmitted diseases. *Ximenia caffra,* indicated for treatment of diabetes and sexually transmitted infections in this study, was shown elsewhere to possess antibacterial activity (Fabry et al., 1998). Fabry et al. (1996) demonstrated the antifungal activity of Ximenia caffra. These findings validate the continued use of the plant species in treating sexually transmitted diseases, especially those caused by fungal and bacterial pathogens. The plant is also used for treatment of venereal diseases in Zimbabwe (Maroyi, 2013). Grewia villosa has been studied for antidiabetic properties (Mondal et al., 2013), phytochemical composition (Bashir et al., 1982) and antibacterial activity (Tanira et al., 1994).

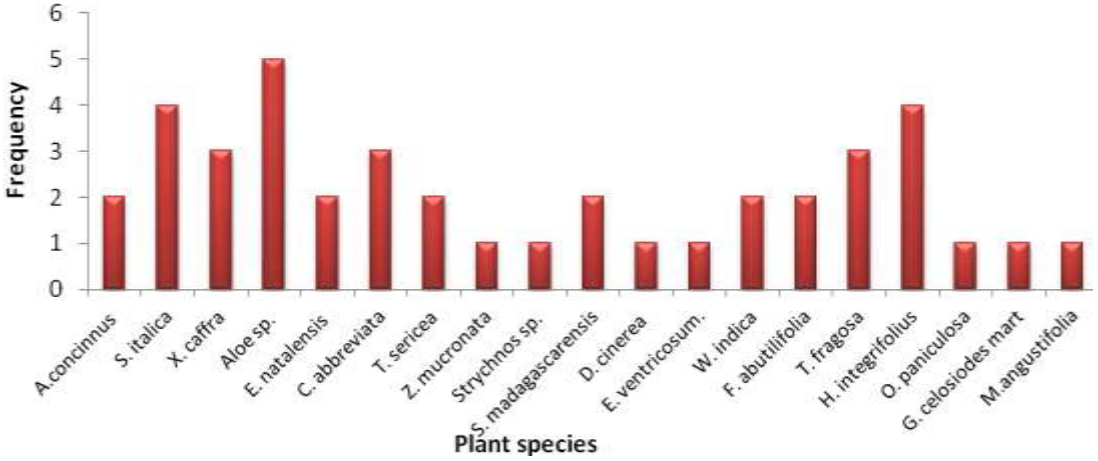

Figure 6: Plants used for sexually transmitted diseases

Plants used for infertility and erectile dysfunction

Nineteen plants species were indicated for treatment of infertility and erectile dysfunction. The most used plant species were *Tinospora fragosa* and *Helinus intergrifolius* (Fig. 7 and Table 3). The local name of *T. Fragosa* is *"makgonatsohle",* and it means it heals all. It is not surprising to find this plant in a variety of mixtures for treatment of many types of diseases. Treatments of sexually transmitted diseases and infertility are overlapping for most of the plants used. It is likely the healers concentrate more on this problem as it maybe one major problem presented in their consulting rooms.

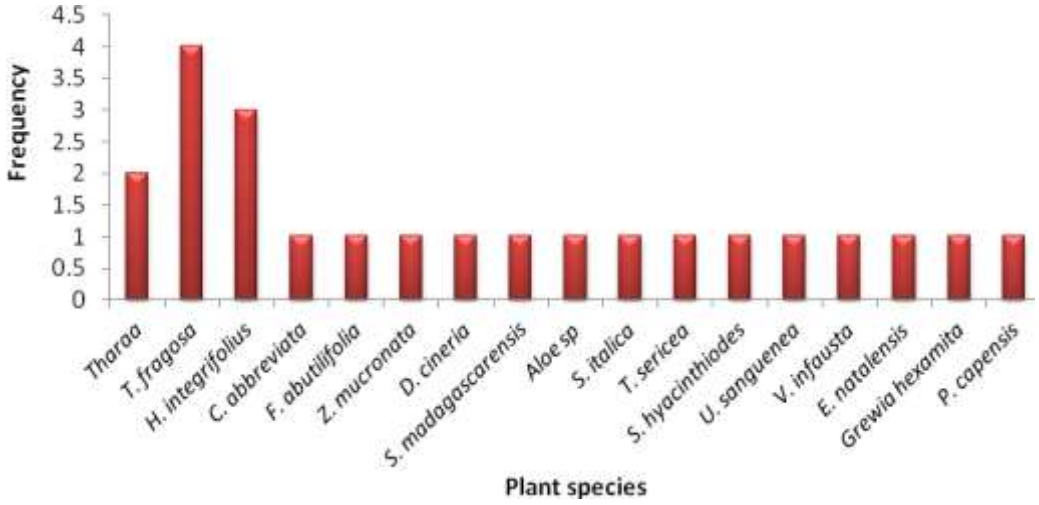

Figure 7: Plants used for fertility and erectile dysfunction

Plants used for stomach ache and vomiting treatment

Fourteen plant species were indicated for treatment of stomach-ache, with *Terminalia sericea, Cassia abbreviata, Gymnospora buxofolia, Ozoroa paniculosa* and *Schotia brachypetala* mentioned more frequently by healers interviewed (Fig. 8 and Table 4). Of all the plants listed only *Colophospermum mopane* was indicated for stomach ache treatments in small children, where the leaves are chewed and spit into the patient's mouth.

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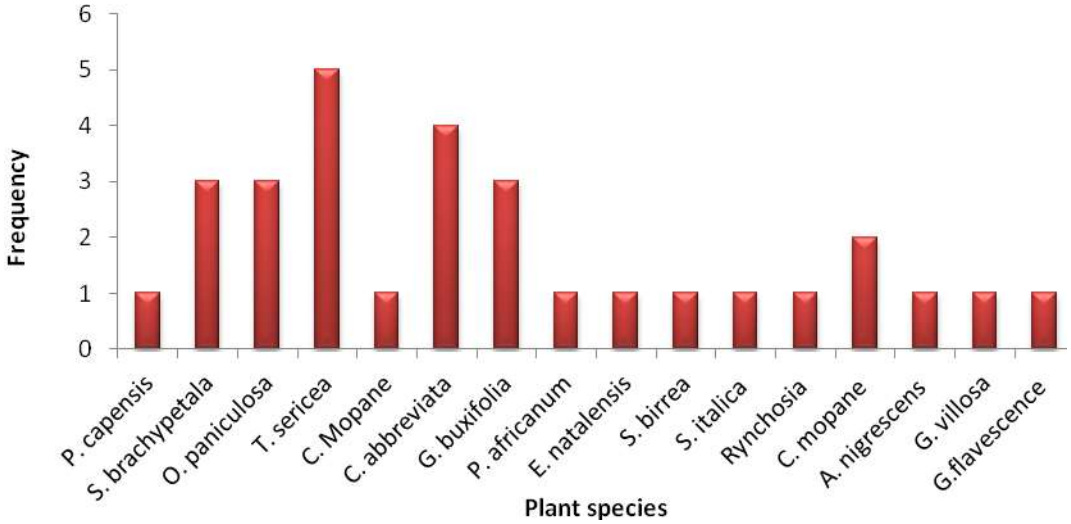

Figure.8: Plants used for stomach ache and vomiting

Plants used for acquired immune-deficiency syndrome treatment

There is a general belief amongst the interviewed healers that acquired immune-deficiency syndrome (AIDS) is not a viral disease but is associated with witchcraft or "*makgoma"*. *Makgoma* is a condition perceived to be caused by uncleanliness resulting from death of relative or immoral sexual practices. The interviewees also confirmed that they could not cure AIDS but indicated a number of plants they use for treatment only in the early stages of the disease. Three plant species were listed, viz; *Cassia abbreviata*, *Ozoroa paniculosa* and *Terminalia sericea* (Table 5).

Plants used for cancer and other diseases treatment

The healers had very limited knowledge about cancer. Most of them believed that cancer results from witchcraft. Two plants species come up in the conversation; viz; *Combretum imberbe* and *Dichrostachys cinerea* (Tables 6 & 7). All the respondents seemed to agree that different forms of tumours may be classified as "*sefolane",* which is a word used for any form of growth outside or inside the body, and may result from acts of witchcraft.

The use of *Cassia abbreviata* is widespread in the village. The plant is used for treatment of diabetes mellitus, sexually-transmitted diseases, symptoms associated with AIDS, infertility and stomachache. In Botswana, *C. abbreviata* is used for treatment of snake bites (Motlhanka and Nthoiwa, 2013). Some of the claims made by traditional healers have been confirmed by scientific methods of investigation. *Hexalobus monopetalus* and *Zanthoxylum lepriuerii* possess antimicrobial activity (Steenkamp et al., 2007; Lucie et al., 2012; Fernandes et al., 2008; Tatsadjieu et al 2003; Ngane et al., 2000). *Sanseviera hyacinthioiodes*, *Gomphrena celosioides*, and *Synadenium cupulare* have been reported to possess antibacterial (McGaw et al., 2000; Gbeassor et al., 1989; Luseba et al., 2011), antifungal (Cochrane, 1998), antioxidant (Aliero et al., 2008), antihelminthic, anti-amoebic and antimalarial (De Moura et al 2004; Mcgaw et al., 2000; Amoo et al., 2013) activities.

Plant family names

Plant species belonging to the family Fabaceae were mentioned as a common ingredient in traditional medicines prepared for treatment of a variety of diseases by healers of Mashishimale village. Combretaceae, represented by *Terminalia* sericea, appeared popular, second after Fabaceae family (Fig. 9). In a separate study conducted in the Vhembe District, plant species belonging to the Fabaceae were common ingredients in medicines used by people of the Lwamondo area (Mahwasane et al., 2013). The Vhembe and Mopani districts are neighbouring sections of the Limpopo Province. There are many aspects of these districts that are common, including cross cultures, vegetation and climate. It is therefore not entirely surprising that Fabaceae family will be used in both districts for traditional medicine preparations. Trees were mentioned more frequently as ingredients in traditional medicines for treatment of a number of diseases, with shrubs a distant second (Fig. 10).

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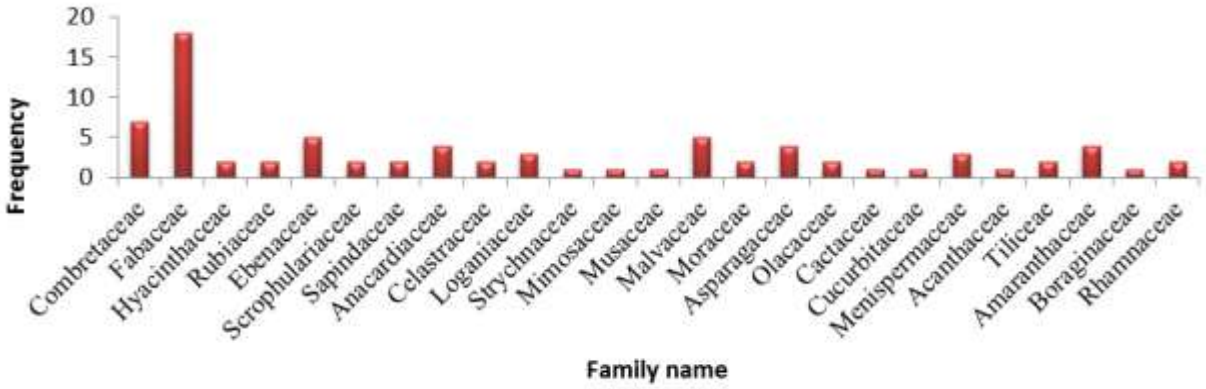

Figure 9: Most identified Plants family name

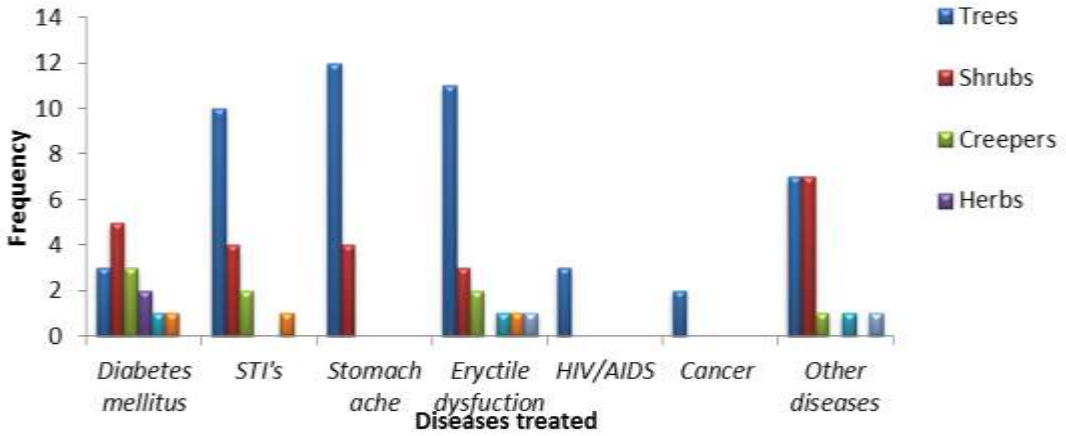

Figure 10: Most identified Plants type

Conclusion

The results of the survey indicate that plants play a significant role in primary healthcare of the community studied. It would seem that each of the major diseases/ailments are treated by traditional methods. Furthermore, information on the use of medicinal plants and the identity of the plants is passed from old generations by word of mouth. Record keeping is very poor and this may mean that in future, the information on components of mixtures, dosages and diseases treated may be lost. Judging by the age of the participating healers, it would seem likely that the younger generations are not taking interest in the practice of traditional medicine, further suggesting that information base is gradually eroding.

This study must be supported by laboratory based investigations to determine the efficacy and safety of the plant species used in traditional medicine. Awareness of the importance of medicinal plants in human healthcare is very important as they have a promising future as potential sources of medicines for many chronic diseases. Many plant species indicated for treatment of diseases have not been subjected to scientific methods of investigation, and the confirmation of their medicinal activities could be a decisive lead in development of treatments of present or future diseases (Rasool, 2012).

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Table 1: Plants used to treat diabetes mellitus

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Torofeiye	Prickly pear	*Opuntia ficus-indica* (L.) Mill.		CACTACEAE	Leaves	Succulent shrub	The leaves are boiled with leaves of *Momordica balsamina* and *Aloe sp*. The extract is drunk by the patients
Nkgakga/nku	African pumpkin	*Momordica balsamina* Wall.	PRU113799.0	CUCURBITACEAE	Leaves	Creeper	Leaves combined with *Aloe sp.* and *O. ficus-indica* and boiled. The leaves are also used as a vegetable.
Makgonatsohle	Aaron's rod	*Tinospora fragosa* (I.Verd.) I.Verd. & Troupin	PRU113838.0	MENISPERMACEAE	Leaves and stem	Creeper	Boiled and drunk. Extract may be mixed with tea or juice (very bitter). Also used to treat many other diseases. Its common name suggests that it can treat any disease.
Mohlakola	Large-leaved guarri	*Euclea natelensis* A.DC *subsp. Angustifolia* F White	PRU113835.0	EBENACEAE	Roots	Tree	Roots boiled may also be mixed with other materials sourced from other plants.
Molomanama	Longtail cassia	*Cassia abbreviata* Oliv.	PRU113819.0	FABACEAE	Stem bark	Tree	Bark boiled or soaked in water. Extract drunk by patients.
Bohlobohlo	Creeping Blepharis	*Blepharis spp* Juss.	PRU117908	ACANTHACEAEA	Roots	Shrub	Roots are boiled and given to patient to drink and roots as well are grinded and put as a paste on open wounds
Mopharantshone big	Mallow raisin	*Grewia villosa* Willd.	PRU117709	TILICEAE	Roots	Shrub	Used as part of mixtures for treatment of diabetes mellitus
Lebolomo la naga	Soft khaki weed	*Gomphrena celosioides* Mart.	PRU117707	AMARANTHACEAE	Roots	Creeper	Used as part of mixtures for treatment of diabetes mellitus

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Table 1: Plants used to treat diabetes mellitus (continued)

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Aloe	Aloe	*Aloe spp* L	Different species	XANTHORRHOEACEAE	Leaves	Succulent	Used in mixtures with different plants for treatment of all kinds of diseases.
Maropolane	Veld violet	*Aptosium linearize* Marloth & Engl.	PRU113818.0	SCROPHULARIACAE	Roots	Herb	Roots or whole plant are used for wound healing
Motayabannyana	Sleepy morning	*Waltheria indica* L.	PRU113813.0	MALVACEAE	Roots	Herb	Boiled in mixtures for all STI's
Setlommana	Neutral henna	*Senna italica* Mill.	PRU113814.0	FABACEAE	Roots	Shrub	Used in mixtures with different plants for treatment of all kinds of diseases
Mokgalo	Buffalo thorn	*Ziziphus mucronata* Willd.		RHAMNACEAE	Roots	Tree	Used in mixtures with different plants for treatment of all kinds of diseases
Mopharantshone small	Sandpaper raisin	*Grewia flavescens* Juss.	PRU117710	MALVACEAE	Roots	Shrub	Used as part of mixtures for treatment of diabetes mellitus
Mokgotla	Mother-in-law's tongue	*Sanseviera hyancinthiodes* (L.) Druce.	PRU117713	ASPARAGACEAE	Roots	Shrub	Roots boiled in mixtures with other plants for treatment of different ailments

Table 2: Plants used to treat sexually transmitted infections

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Moreetse	Sicklebush	*Dichrostachys cinerea* (L.) Wight & Arn. Subsp. *Africana* Brenan & Brummitt var. Africana	PRU113836.0	MIMOSACEAE	Roots	Tree	Boiled in mixtures for all STI's
Banana	Ethiopian banana	*Ensete ventricosum* (Welw.) Cheesman		MUSACEAE	Roots	Tree	Boiled in mixtures for all STI's
Motayabannyana	Sleepy Morning	*Waltheria indica* L.	PRU113813.0	MALVACEAE	Roots	Shrub	Boiled in mixtures for all STI's
Mofa	Large-leaved rock fig	*Ficus abutilifolia* (Miq.)	PRU113789	MORACEAE	Roots/stem bark	Tree	Boiled in mixtures for all STI's
Lefalatsamaru	Asparagus	*Asparagus concinnus* (Baker) Kies	PRU1113000	ASPARAGACEAE	Roots	Shrub	Roots boiled to treat gonorrhoea and also in mixtures for treatment of all diseases, leaves used t stop rain.
Setlommana	Neutral henna	*Senna italica* Mill.	PRU113814.0	FABACEAE	Roots	Shrub	Boiled in mixtures and administered to all STI patients.
Mochidi	Large sourplum	*Ximenia Caffra* Sond.	PRU117906	OLACACEAE	Roots	Tree	Boiled in mixtures
Mohlakola	Large-leaved guarri	*Euclea natelensis* A.DC *subsp. Angustifolia* F White	PRU113835.0	EBENACEAE	Roots	Tree/ Shrub	Boiled in mixtures
Molomanama	Long pod cassia	*Cassia abbreviata* Oliv.	PRU113819.0	FABACEAE	Roots/stem bark	Tree	Boiled and extract administered for all STI's

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Table 2: Plants used to treat sexually transmitted infections (continued)

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Mososo	Silver cluster-leaf	*Terminalia sericea* Cambess.	PRU113817.0	COMBRETACEAE	Roots	Tree	Boiled in mixtures and administered for all STI's.
Mowawa	Black monkey orange	*Strychnos madagascarensis* Spreng. ex Baker	PRU113811.0	LOGANIACEAE	Roots	Tree	Boiled in mixtures for all STI's
Morapa	Black monkey orange	*Strychnos spinosa* Lam.		LOGANIACEAE	Roots	Tree	Boiled in mixtures for all STI'
Mokgalo	Buffalo thorn	*Ziziphus mucronata* Willd.		RHAMNACEAE	Roots	Tree	Used in mixtures with different plants for treatment of all kinds of diseases
Aloe	Aloe **vera**	*Aloe spp*	Different species	XANTHORRHOEACEAE	Leaves	Succulent	Used in mixtures with different plants for treatment of all kinds of diseases.
Makgonatsohle	Aaron's rod	*Tinospora fragosa* (I.Verd.) I.Verd. & Troupin	PRU113838.0	MENISPERMACEAE	Leaves and stem	Creeper	Boiled and drunk. Extract may be mixed with tea or juice (very bitter). Also used to treat many other diseases. Its common name suggests that it can treat any disease.
Morakane	Soap creeper	*Helinus intergrifolius* (Lam.) Kuntze.	PRU117192	RHAMNACEAE	Roots	Tree	Roots boiled in combination with other plants to treat STI's.
Monoko	Common resin tree	*Ozoroa paniculosa* (Sond.) R.Fern. & A.Fern.	PRU115079.0	ANACARDIACEAE	Roots	Tree	Boiled together with roots of other plants
Lebolomo la naga	Soft khaki weed	*Gomphrena celosioides* Mart.	PRU117707	AMARANTHACEAE	Leaves	Creeper	Roots boiled and used in mixtures for treatment of STI's

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Table 3: Plants used to treat fertility and erectile dysfunction

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Morakane	Soap creeper	*Helinus intergrifolius* (Lam.) Kuntze.	PRU117192	RHAMNACEAE	Roots	Tree	Roots boiled in combination with other plants totreat STI's.
Molomanama	Long pod cassia	*Cassia abbreviata* Oliv.	PRU113819.0	FABACEAE	Stem bark	Tree	Bark boiled or soaked in water. Extract drunk by patients.
Mofa	Large-leaved rock fig	*Ficus abutilifolia* (Miq.)	PRU113789	MORACEAE	Roots/stem bark	Tree	Boiled in mixtures for all STI's
Moreetse	Sicklebush	*Dichrostachys cineria* (L) Wight & *subsp.Arn Africana Brenan & Brummit var. Africana*	PRU113836.0	FABACEAE	Roots	Tree	Used in mixtures with different plants for treatment of all kinds of diseases
Mokgalo	Buffalo thorn	*Ziziphus mucronata* Willd.		RHAMNACEAE	Roots	Tree	Used in mixtures with different plants for treatment of all kinds of diseases
Mowawa	Black monkey orange	*Strychnos madagascarensis* Spreng. ex Baker	PRU113811.0	LOGANIACEAE	Roots	Tree	Boiled in mixtures for all STI's
Setlommana	Neutral henna	*Senna italica* Mill.	PRU113814.0	FABACEAE	Roots	Shrub	Boiled in mixtures and administered to all STI patients.
Mososo	Silver cluster-leaf	*Terminalia sericea* Cambess.	PRU113817.0	COMBRETACEAE	Roots	Tree	Boiled in mixtures and administered for all STI's.
Makgonatsohle	Aaron's rod	*Tinospora fragosa* (I.Verd.) I.Verd. & Troupin	PRU113838.0	MENISPERMACEAE	Leaves and stem	Creeper	Boiled and drunk. Extract may be mixed with tea or juice (very bitter). Also used to treat many other diseases. Its common name suggests that it can treat any disease.

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Table 3: Plants used to treat fertility and erectile dysfunction (continuation)

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Mokgotla	Mother-in-law's tongue	*Sanseviera hyancinthiodes* (L.) Druce.	PRU117713	ASPARAGACEAE	Roots	Shrub	Roots boiled in mixtures with other plants for treatment of different ailments.
Mmilo	Wild medlar	*Vangueria infuasta* Burch.	PRU113837.0	RUBIACEAE	Roots	Tree	Roots of *V. infausta* and roots of *Helinus intergrifolius* boiled and drunk for fertility. Used after first treatment above.
Mohlakola	Large-leaved guarri	*Euclea natelensis* A.DC *subsp. Angustifolia F White*	PRU113835.0	EBENACEAE	Roots	Tree/Shrub	Roots, together with roots of *Grewia hexamita* and *P. capensis* boiled and drunk for patients with continuos mesntuation. Also used to improve fertility.
Mososo	Silver cluster-leaf	*Terminalia sericea* Cambess.	PRU113817.0	COMBRETACEAE	Roots	Tree	Boiled in mixtures and administered for all STI's.
Lebolomo la naga	Soft khaki weed	*Gomphrena losioides* Mart.	PRU117707	AMARANTHACEAE	Roots	Creeper	Roots boiled and used in mixtures for treatment of STI's
Motswalela-kgoro	Jacket plum	*Pappea capensis* Sond. & Harv.	PRU1 13791.0	SAPINDACEAE	Stem bark	Tree	Boiled and extract administered for dysentery. Also used in mixtures with *E. divinorum* and *Grewia hexamita* to treat continuous menstruation.
Sekanama	Sea squill	*Urginea sanguinea* Schinz	PRU113820.0	HYACINTHACEAE	Tuber	Perennial bulb	Tuber immersed in water and drunk for early treatment of fertility. Aloe also in the mixture. Purgative effects.
Aloe	Aloe vera	*Aloe spp*	Different species	XANTHORRHOEACEAE	Leaves	Succulent	Used in mixtures with different plants for treatment of all kinds of diseases. Boiled thoroughly and juice drunk

http://dx.doi.org/10.4314/ajtcam.v12i3.2

Table 4: Plants used to treat stomach complaints

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Motswalela-kgoro	Jacket plum	*Pappea capensis* Sond. & Harv.	PRU113791.0	SAPINDACEAE	Stem bark	Tree	Boiled and extract administered for dysentery. Also used in mixtures with *E. divinorum* and *Grewia hexamita* to treat continuous menstruation.
Monopi	Weeping boer-bean	*Schotia brachypetala* Sond.	PRU113838.0	FABACEAE	Stem bark	Tree	Boiled and extract administered for dysentery
Monoko	Common resin tree	*Ozoroa paniculosa* (Sond.) R.Fern. & A.Fern.	PRU115079.0	ANACARDIACEAE	Stem bark	Tree	Immersed in water and extract administered
Mokgwalo	Knob thorn	*Acacia nigrescens* Oliv.	PRU117190.0	FABACEAE	Stem bark	Tree	Boiled and administered for dysentry
Mososo	Silver cluster-leaf	*Terminalia sericea* Cambess.	PRU113817.0	COMBRETACEAE	Stem bark	Tree	Boiled. Leaves also boiled and extract administered for stomach complaints
Mohlanare	Balsam tree	*Colophospermum mopane* (J.Kirk *ex* Benth.) J.Léonard		FABACEAE	Stem bark	Tree	Leaves chewed and spitted into baby's mouth
Molomanama	Long pod cassia	*Cassia abbreviata* Oliv.	PRU113819.0	FABACEAE	Stem bark and roots	Tree	Boiled and drunk
Sephatwa	Common spike-thorn	*Gymnosporia buxifolia* (L.) Szyszyl.		CELASTRACEAE	Stem bark	Tree	Leaves crushed and immersed in water. Also drunk to stop vomiting.
Setlommana	Neutral henna	*Senna italica* Mill.	PRU113814.0	FABACEAE	Roots	Shrub	Boiled in mixtures and administered to all STI patients.

http://dx.doi.org/10.4314/ajtcam.v12i3.2

Table 4: Plants used to treat stomach complaints (continuation)

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Mosese	African wattle	*Peltoforum africanum* Sond.	PRU113816.0	FABACEAE	Stem bark	Tree	Inmmersed in water with *C. abbreviata*
Monamane	Anthill saffron	*Elaeodendron transvaalense* (Burtt Davy) R.H.Archer	PRU113815.0	CELASTRACEAE	Bark	Tree	Immersed in water and extract drunk
Morula	Marula	*Sclerocarya birrea* Hochst.		ANACARDIACEAE	Bark (root or stem)	Tree	Boiled
Mohlakola	Large-leaved guarri	*Euclea natelensis* A.DC *subsp. Angustifolia* F White	PRU113835.0	EBENACEAE	Roots	Tree/Shrub	Roots, together with roots of *Grewia hexamita* and *P. capensis* boiled and drunk by patients with continuous menstruation. Also used to improve fertility.
Mopharantshone big	Mallow-leaved cross-berry	*Grewia villosa* Willd.	PRU117709	TILICEAE	Roots	Shrub	Used as part of mixtures for treatment of diabetes mellitus
Mopharantshone small	Sandpaper raisin	*Grewia flavescens* Juss.	PRU117710	MALVACEAE	Roots	Shrub	Used as part of mixtures for treatment of diabetes mellitus

Table 5: Plants used to treat AIDS (HIV)

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Molomanama	Long pod cassia	*Cassia abbreviata* Oliv.	PRU113819.0	FABACEAE	Roots	Tree	Boiled together with roots of *T. sericea* and *O. paniculosa* for AIDS treatment
Mososo	Silver cluster-leaf	*Terminalia sericea* Cambess.	PRU113817.0	COMBRETACEAE	Roots	Tree	Boiled together with roots of *C abbreviata* and *O. paniculosa* for AIDS treatment
Monoko	Common resin tree	*Ozoroa paniculosa* (Sond.) R.Fern. & A.Fern.	PRU115079.0	ANACARDIACEAE	Roots	Tree	Boiled together with roots of *T. sericea* and *C. abbreviata* for AIDS treatment

http://dx.doi.org/10.4314/ajtcam.v12i3.2

Table 6: Plants used to treat cancer

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Mmoto	Leadwood	*Combretum imberbe* Wawra		COMBRETACEAE	Root or stem bark	Tree	Boiled and drunk. Burnt and ash applied to tumours
Moreetse	Sicklebush	*Dichrostachys cineria* (L) Wight & *subsp.Arn Africana Brenan & Brummit var. Africana*	PRU113836.0	FABACEAE	Roots	Tree	Ash mixed with ash of *C. imberbe* and applied to tumour

Table 7: Other diseases treated

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Sekanama	Sea squill	*Urginea sanguine* Schinz	PRU113820.0	HYACINTHACEAE	Tuber	Perennial bulb	Tuber immersed in water and drunk for early treatment of fertility. Aloe also in the mixture. Purgative effects.
Mmilo	Wild medlar	*Vangueria infausta* Burch.	PRU113837.0	RUBIACEAE	Roots	Tree	Roots of *V. infausta* and roots of *Helinus intergrifolius* boiled and drunk for fertility. Used after first treatment above.
Mohlakola	Large-leaved guarri	*Euclea natelensis* A.DC *subsp. Angustifolia* F White	PRU113835.0	EBENACEAE	Roots	Tree/Shrub	Roots, together with roots of *Grewia hexamita* and *P. capensis* boiled and drunk for patients with continuos mesntuation. Also used to improve fertility.
Monantane		*Indigofera nebrowniana* J.B.Gillett	PRU113812.0	FABACEAE	Roots	Shrub	Roots chewed for stimulation of appetite.
Mmoto	Leadwood	*Combretum imberbe* Wawra		COMBRETACEAE	Leaves	Tree	Leaves boiled and administered for coughs
Maropolane		*Aptosimum linearie* Marloth & Engel.	PRU113818.0	SCROPHULARIACEAE.	Leaves	Shrub	Leaves heated (on fire) and applied on affected area for tissue repair. May also be used for snake bite. Whole plant boiled to treat toothache.
Mochidi	Large sourplum	*Ximenia Caffra* Sond.	PRU117906	OLACACEAE	Leaves	Tree	Leaves boiled for Eye ache and Bilharzia

http://dx.doi.org/10.4314/ajtcam.v12i3.2

Table 7: Other diseases treated (continued)

Local Name	Common name	Scientific Name	Voucher no	Family	Plant part	Plant type	Method of preparation
Mosemane	Silky thorn	*Acacia rehmanniana* Schinz	PRU117191	FABACEAE	Leaves	Shrub/ Tree	Burnt and inhaled for persistent headache
Lekudu	Levant cotton	*Gossypium herbacium* L. *ssp. Africanum* (Watt) Vollesen	PRU117186	MALVACEAE	Bark	Shrub	The cotton is inserted into the ear for ear ache.
Molebatje	Satinwood	*Zanthoxylum leprieurii* Guill. & Perr.		RUTACEAE	Roots	Tree	Roots boiled and given to patient to forget (soothering or comforting) after a loss of a loved one.
Lebolomo la naga	Soft khaki weed	*Gomphrena celosioides* Mart.	PRU117707	AMARANTHACEAE	Roots	Creeper	Roots boiled and used in mixtures for treatment of STI's
Mokhure	Dead-man's tree	*Synadenium cupulare* (Boiss.) Wheeler ex A.C.White , R.A.Dyer & B.Sloane	PRU117708	EUPHORBIACEAE	Roots	Shrub	Roots boiled and given to patients suffering from erectile dysfunction.
Mothobathobe	Largefruit saucerbush	*Cordia grandicalyx* (Oberm.)		BORAGINACEAE	Roots	Tree	Used in mixtures for treatment of different ailments

List of abbreviations

STI's; Sexually transmitted disease, AIDS; acquired immune deficiency syndrome, HIV; human immunodeficiency virus, IPNI; The International Plant Names Index; LJS; Leshweni Jeremia Shai, MAC; Mildred Alinah Chauke, MAM; Mothatheo Alfred Mogale, MPT; Milingoni Peter Tshisikhawe; MPM, Matlou Phineas Mokgotho.

Competing interest

The authors declare that they have no competing interests in relation to this manuscript.

Authors' contribution

MAC, MPM and LJS carried out the field work. MAC also analysed the results. The study was conceived by the LJS and MAM while the manuscript was written by MAC. MAM, LJS and MPT proof read the manuscript. MPT verified the scientific and family names on the IPNI.

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Acknowledgements

The authors acknowledge Tshwane University of Technology and the National Research Foundation (under the Thutuka-REDIBA programme) for funding the project. LJS is a recipient of the NRF funding. The authors also thank Chief Catherine Shai for granting permission for collection of plant material in the village. The authors also thank all the healers who participated in the study.

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