Research Article **IJTCM (2016), Vol. 1, Issue 04**

International Journal of Traditional and Complementary Medicine
(ISSN:2474-1361)

Ethnomedicinal uses of indigenous plant species in Mogalakwena Municipality of Waterberg District, Limpopo Province South Africa

L.P. Maema*, S.M. Mahlo and M.J. Potgieter

Department of Biodiversity, School of Molecular and Life Sciences, University of Limpopo, Private Bag X1106, Sovenga 0727, South Africa.

ABSTRACT

Various indigenous cultures in the Limpopo Province of South Africa are transitioning from a traditional lifestyle to a westernised one. This leads to a loss of cultural identity and knowledge. Consequently, an ethnobotanical survey was conducted to investigate the medicinal uses of indigenous plants in the Mogalakwena Local Municipality of the Waterberg District in Limpopo Province, South Africa, an area experiencing rapid transition to a western lifestyle. The study interviewed 30 traditional healers via a semi-structured questionnaire. Thirty five indigenous plant species were documented to be used in the treatment of 37 ailments. These species are distributed among 22 families, of which Asteraceae (5 species), Fabaceae (4 species) and Hyacinthaceae (3 species) are the most prominent. The remaining families are represented by either a single or two species. Bark and roots accounted for 50% of the material used, followed by leaves (12%) and tuber (8%), amongst other. Preparation of remedies was mainly through decoctions (40%), followed by infusions (33.3%), paste (8.3%), and fumes through burning (6.7%). The high percentage of bark and roots use is an area of concern. Furthermore this study found many instances of unsustainable harvesting techniques. These issues need immediate attention for the long term conservation of a number of threatened species identified in this study.

Keywords:
Bapedi traditional health practitioners, Mogalakwena Local Municipality, ethnomedicinal survey

***Correspondence to Author:**
Lesibana Petrus Maema
Department of Biodiversity, School of Molecular and Life Sciences, University of Limpopo, Private Bag X1106, Sovenga 0727, South Africa.
Email: plesibana@gmail.com

eSciencePublisher
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Website: http://escipub.com/

INTRODUCTION

South Africa has a long history of traditional medicinal usage and is imbedded with unique and diverse indigenous cultures (van Vuuren, 2008), which produced a rich heritage of traditional knowledge on the uses of medicinal plants (Iwu, 2014). In this regard, Dahlberg and Trygger (2009) view indigenous knowledge as local, unique and traditional, crafted around specific conditions by a community to a particular area. This localised indigenous knowledge plays a vital role in the treatment of a variety of ailments by traditional health practitioners (Mathibela, 2012).

Traditional medicine plays an important role in the primary health care of South Africa (Truter, 2007). Here traditional health practitioners hold a significant repository of information about medicinal plants and their application in primary health care. In South Africa, approximately 200 000 traditional health practitioners use herbal medicine for treatment of various ailments, servicing about 80% of the population in primary health care (Lewu and Afolayan, 2009). It is estimated that over one-third of the world's population lacks regular access to modern medicine and therefore traditional medicine systems is sometimes seen as the only affordable source of health care, especially for those in impoverished rural areas (Zhang, 2004). Williams *et al*. (2000) noted that the utilization of various plant species by traditional health practitioners is influenced by the diversity and geographical distribution of medicinal plants.

South Africa is endowed with a rich plant diversity, hosting about more than 30 000 higher plant species (Van Wyk & Smith, 2001), which is about 6% of the planet's plant species (Driver *et al*., 2012). South Africa is further recognised as one of only 17 megadiverse countries. Driver *et al*. (2012) further noted that more than 2 000 plant species is used medicinally in South Africa. Irrespective of high plant diversity, Van Wyk (2008) showed that medicinal plants that are used in Africa are not well described and studied, and the information remains entrenched in local communities.

African indigenous knowledge systems are predominantly oral and not written-based, and therefore susceptible to loss and change over time (Van Wyk *et al*., 2009). Weitz and Thring (2005) stated that from a cultural point of view it is important to document this knowledge for use by future generations. Therefore, the present study aimed to document indigenous plant species that are used to treat various diseases in human and to identify their conservation status in the Mogalakwena Municipality of the Waterberg District, Limpopo Province, South Africa.

MATERIALS AND METHODS

Study area and demographics

The study was conducted in the Mogalakwena Municipality of the Waterberg District, Limpopo Province, South Africa (Figure 1). Geographically Mogalakwena Municipality lies between 23°10′−24°20′S and 28°10'−29°10′E (BGIS.Sanbi.org). The Mogalakwena Municipality covers an area of 6166 km^2, hosting 614 139 people, with black Africans the dominant group, comprising 90% of the population. Poverty due to high levels of unemployment still remains a major challenge in Mogalakwena Municipality. Consequently the majority of the people resides in villages, and relies primarily on agricultural and subsistence farming activities to meet their livelihood needs (StatsSA, 2012).

Ethnobotanical survey

Data was collected from June 2015 to November 2015 in 15 local villages within the study area. Two Bapedi (the dominant cultural group) traditional health practitioners were selected via the convenient sampling method, resulting in 16 females and 14 male healers been interviewed. Our respondents were in an age range of between 25 to 70 years. Data was collected using a semi-structured questionnaire using the face-to-face interview technique as described in similar studies (Akaydin, 2013; Seid and Aydagnehum, 2013), supplemented with guided field tours with traditional health practitioners . Information such as vernacular name, source of plants collection, plant part(s) used, ailments treated, as well as preparation methods and dosage were documented.

Plant collection and identification

Voucher specimens, as pointed out by accompa-

nied traditional health practitioners, were collected from both home gardens and natural communal areas. Plant species were initially identified by their vernacular names. Later taxonomic identification was done by a trained taxonomist at the Larry Leach Herbarium (UNIN) of the University of Limpopo.

Statistical analysis

The data was captured in Microsoft Excel 2010. A descriptive statistic procedure like percentage and frequency distribution were employed for data analysis.

Ethical considerations

A permit was requested and obtained from various traditional councils within the Mogalakwena Municipality for conducting research within their area of jurisdiction, and to meet with traditional health practitioners in order to request them to participate in the study. Each traditional healer was requested to sign a consent form as approved by the University of Limpopo. As such all ethics related to people's privacy, confidentiality, and anonymity, were observed, adhered to and respected. Participants in this study were voluntary, participated freely and anonymously. The sources of primary and secondary data and information are acknowledged.

RESULTS

Species diversity

The current study documented 35 indigenous plant species belonging to, 33 genera and 23 families. The Asteraceae (Compositae) are represented by 5 plant species, Fabaceae by 4 plant species, followed by the Hyacinthaceae (3 plant species). The families Anacardiaceae, Combretaceae, and Euphorbiaceae are presented by two plant species each, while the remaining families contained one plant species each.

A very similar picture comes to light regarding genera diversity. Most genera are represented by one or two species. However, the most prominent genera occur in the Asteraceae (5 genera), Fabaceae (4 genera) and Hyacinthaceae (3 genera) (Table 1).

Trees are the most dominant (40%), followed by herbaceous plants (20%), geophytes and shrubs constituted 11.4% each, whereas succulent, creepers, climber contributed 8.6%, 5.7%, 2.9% respectively.

The most frequently used plant species is *Drimia elata*, followed by *Ziziphus mucronata*, *Eucomis palladiflora, Geigeria aspera*, *Adenia glauca, Hypoxis hemerocallidea*, *Elaedendron transvalense*, and *Dicoma anomala* (Figure 2).

Plant parts used

This study found that 9 different plant parts are used to prepare remedies. The most used plant part was bark and roots used in 25% of documented cases, followed by roots leaves (16%), tuber (8%). Stems and bulbs as well as using the entire plant were recorded 6% of the time. It was further noticed that fruits and rhizomes were only used in 2% and 4% respectively of the documented cases (Figure 3).

Ailments treated

The study recorded 37 different ailments that are being treated through traditional medicine. These treatments ranged from simple headaches, earaches and skin rush to complicated treatments involving HIV/AIDS and Tuberculosis (Table 1). The most frequently treated ailments are; respiratory infections (27.4%), followed by general diseases (23.7%) such as immunization, fever, blood cleansing, hypertension, to more specialised treatment for liver and kidney failure, gastro-intestinal problems (17.8%), dermatological (12.6%) and gynaecological ailments (6.7%).

Of all ailments treated, coughing was frequently mentioned ailment treated in the study area. The high frequency of treated ailment can be linked to the number of available medicinal plants. For instance, seven plants species are used to treat cough and this provide several options when other plant species are available. Another ailment that is highly treated is blood cleaning, in which six different species can be used as alternatives (Table 1). It is also worth noting that single plant species can be utilized to treat several ailments depending on plant part used as well as prepa-

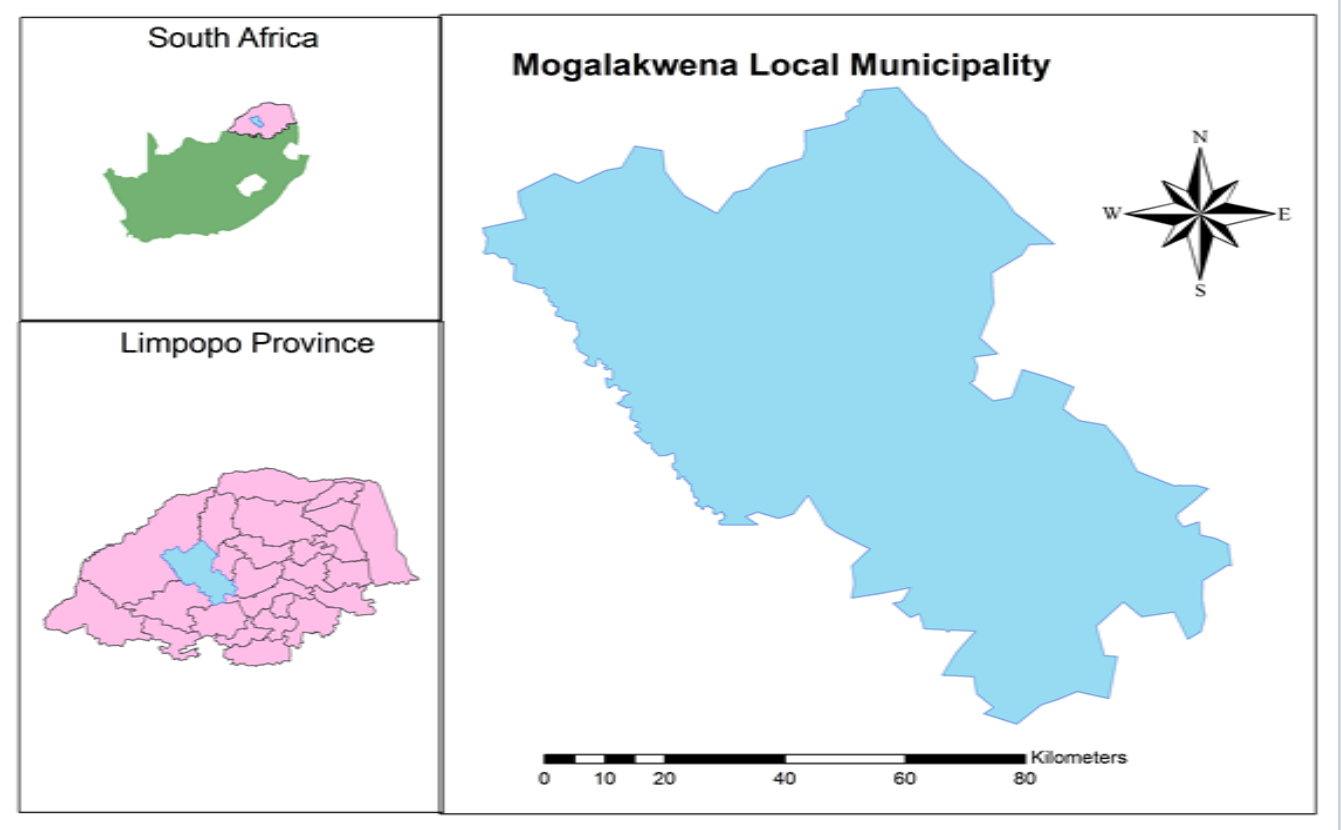

Figure 1. Study area: Mogalakwena Municipality.

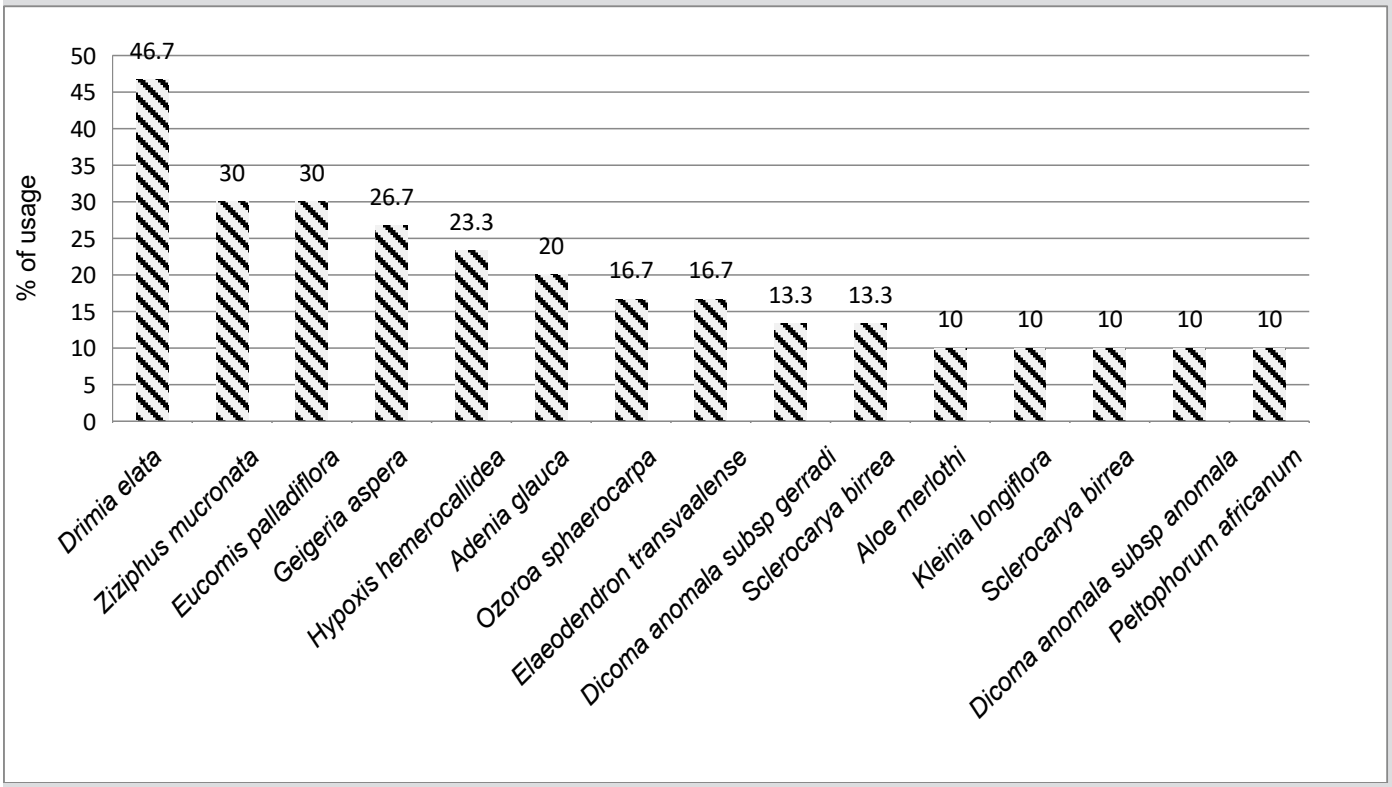

Figure 2: Frequency of used plant species.

ration method. It is evidenced that 45% of documented plants are used to treat single ailments, 35% can treat two ailments whereas 7.5% can treat 3 different ailments. Furthermore, five species namely: *Drimia elata, Geigeria aspera, Hypoxis hemerocallidea* and *Ziziphus mucronata* are used to treat more than three disease ailments (Figure 4).

Preparation of remedy

Method of preparation is mainly through decoction (40%), followed by infusions (33.3%), paste (8.3%), burning (6.7%), and powder (5%), whereas chewing and squeezing of the juice contributed 1.7% each.

About 87% of remedies was prepared from only one species, 10% through a mixture of two different species, and in 3% of cases material from three plant species were combined to prepare a remedy. For instance, two species are involved the preparation of a decoction used for the immunization of infants roots. Here roots of *Asparagus sauveolens* and stem of *Adenia glauca* are used. In another example, squeezed juice of *Dicoma anomala* subsp gerraddi plants is mixed with powdered bark of *Ozoroa sphaerocarpa* to treat Tuberculosis. In another classic example of mixing two species, *Dicerocaryum eriocarpum* is mixed with *Bidens pilosa* to clean the womb after birth. A decoction of both *Ozoroa sphaerocarpa* and *Solanum panduriforme* roots are used to clear nasal blockage. In a case of mixing three species gum and roots of *Ximenia caffra* and roots of *Ziziphus mucronata and Datura stromanium* are used to treat uncontrolled menstruation and infertility in women. It is important to highlight that exotic plants such as *Bidens pilosa* and *Datura stromanium* are also combined with indigenous plants for preparation of remedy.

Mode of administration

Administration depends on the preparation methods and ailments treated. This study recorded oral (71.7%) as the most used administration mode, followed by topical applications (11.7%), bathing (6.7%), ear drop and sublingual (3.3% each), whereas gargling and inhaling smoke contributed 1.7% each.

Dosage

Prescriptions vary considerably with traditional health practitioners. In the case of oral administrations, the general dosage is either half cup or full tin cup (300 ml), taken twice or thrice a day after meals. Some infusions require a mixture of half powdered tablespoon or full teaspoon in 300 ml cup. It was further noticed that a finger pinch of powdered plant part is often mixed with a teaspoon of cooking oil. For instance, a pinch of dried and powdered tuber of *Dicoma anomala* subsp anomala is mixed with cooking oil to treat asthma.

With topical application modes, a handful of plant material is crushed or powdered and hand-applied for the treatment of skin related ailments. For example, swelled legs are treated by using 3-5 litre decoction of *Adenia glauca* by gently massaging legs. For bathing 3 to 5 litres of decoction is used to treat certain diseases. For ear related problems, one or two drops of the remedy are applied to the affected ear canal. Another dosage that was encountered is smoking, where a small amount is rolled in newspaper and smoked twice a day.

Conservation status

Of all documented plant species in the study area, 82% (n=29) appear in the South African National Biodiversity Institute's National Red Data List category as least concerned (LC) plant species. However, 8.5% namely *Elaeodendron tranvaalense*, *Drimia sanguine* and *D. pallidiflora* are near threatened (NT). *Hypoxis hemerocallidea* is the only documented plant classified as declining (DC), and *Drimia elata* as Data Deficient - Taxonomically Problematic (DDT). *Monadenium lugardiae* appear under the red data list as Not Evaluated (NE). No plant species are found under the highly important categories such as Critically Rare (CR), Critically Endangered (CR) (EN) and Regionally Extinct (RE).

This study found that the medicinal use is dominated by plants harvested from communal wild areas (83.3%), as opposed to using cultivated plants (16.2%) from home gardens. This dominance of using wild plants is supplemented by traditional healer's view that 69% of plants used are still commonly found, with 16.7% of spe-

cies still viewed as abundantly distributed. Only 14.3% of plant species are viewed as rare.

DISCUSSION

Species diversity

The large floristic diversity of medicinal plants documented in the Mogalakwena Municipality does come as a surprise, seeing that previous records from Semenya (2012) only indicated 5 species being used in this area. Thus this study greatly expands on our understanding of the range of species being employed. The presence of such a large number of plant species and their associated ethno-medicinal knowledge indicates that the study area has a very high diversity of medicinal plants, and that indigenous knowledge of traditional health practitioners in this area compare favourably with findings of Semenya (2012) for the Limpopo Province as a whole, Tshisikhawe (2002) for the Venda area of the Limpopo Province, and De Wet *et al*. (2012) for the northern Maputaland, KwaZulu-Natal Province (South Africa). The fact that a number of species from this study is also commonly used in other parts of the province (Semenya & Maroyi, 2013) and even in countries neighbouring South Africa such as Zimbabwe (Maroyi, 2013) is potentially a cultural indication of acceptance of efficacy.

The predominance of the Asteraceae and Fabaceae families in our study is consistent with finding obtained by Semenya *et al.* (2013a) at the Matebel-Village, located in the same Local Municipality. The prevalence of the Hyacinthaceae comes as no surprise as this family contains numerous species that are used throughout South Africa for their exceptional medicinal properties (Louw *et al*., 2002).

Plant parts used

Although medicinal properties of a species vary depending on part of the plant used, harvesting regimes, as well as geographical location and environmental conditions (Fennell *et al*., 2004), the high use of bark and roots as material can be attributed to their universally perceived high value as medicine irrespective of the above-mentioned influences in the study area. This finding is in line with those of Moeng and Potgieter (2011) and Semenya (2012) for the Limpopo Province. These plant parts are also favoured because they have long shelf-life when dried-stored (Street *et al*., 2008). Nevertheless, Semenya *et al.* (2013b) cautioned on the use of roots and stem as harvesting them have an extremely detrimental effect on the survival of individual plants. Williams *et al.* (2000) noted that when underground parts and stem-bark are mostly used, this will always results in plant mortality. In this regard, Shackleton *et al*. (2007) noted that harvesting bark, for example, opens wounds and exposes the plant to numerous pathogens that could ultimately lead to stem deterioration. In contrast to plant parts those are highly used. Fruit is rarely used as plant part for treatment of ailments (figure 3). The low use of fruit can be due to seasonal availability. The high frequency use of bark and roots is because these plant parts are always available throughout the year.

Numerous alternative methods of harvesting have been advocated. These include, amongst other, the utilization of leaves as alternatives (Moeng, 2010), harvesting material from different geographical locations (Semenya, 2012), and preventing ring-barking of woody species (Shackleton *et al*., 2007; van Wyk *et al*., 2009). The above-mentioned techniques will allow for a speedy recovery of individual plants and localised populations of a species. Thus, proper harvesting methods are deemed of vital importance to ensure long term species survival.

Ailments treated

The prevalence of various infections in the study area could results from various factors such as socio-economic status and environmental conditions. According to Norman *et al*. (2007) socio-economic status poses simultaneous risk for ill health related to industrialisation and underdevelopment. Respiratory infections in industrialised area are induced by air pollutants from various sources of contaminants such as factories, mining activities, and other sources of air pollution (Nriagu *et al*., 1999). In contrast, respiratory infections in underdeveloped can be ascribed to smoke inhalation from cooking fires as well as dust from gravel roads and this is consequence of inadequate supply of services such as electricity, tar-roads, water and sanitation (Röllin

et al., 2004: Norman *et al*., 2007).

Mayosi *et al.* (2009) reported a shift of health related problems that are accompanied by the rise of non-communicable and prevalence of infectious diseases to poor rural communities. Demographic changes and low socioeconomic status are reported to increase non-communicable disease in low income people (Puoane *et al*. 2005). Prevalence of general diseases such as hypertension, blood impurity, and kidney and leaver failure could results from varying demographic changes (Hornbrook and Goodman, 1996). Gastro-intestinal infections such cholera and diarrhoea are widespread to areas that lack clean water and with poor sanitation. It should be noted that frequency of treated ailments does not necessarily reflect its prevalence, perhaps the knowledge and number of available medicinal plants used to treat such infections.

The traditional medicine employed by Bapedi healers covers a range of different ailments. Eleven categories are assigned according to most related ailments. This covers antidote (Snake bite and food poison), dermatological (Complexion, external sore, skin rush, swollen leg and wounds), Gastro intestinal system (Diarrhoea, dysentery, internal sore, stomach-ache, indigestion, and vomit), General diseases (Immunization, fever, hypertension, Blood cleaning, leaver and kidney failure), Gynaecological (Womb cleaner, Infertility, uncontrolled menstruation), musculoskeletal system (Arthritis and muscle pains), oral infections (Toothache and dental worms), respiratory infections (Asthma, cold and flu, chough, nasal block, and sore throat), STDs (gonorrhoea and HIV/AIDS), fainting, sore eyes and earaches.

Various plants can be used to treat common ailment. A phenomenon observed by several studies in South Africa and elsewhere (Mathabe *et al*., 2006; York *et al*., 2011; Semenya and Potgieter, 2012; Maroyi, 2013; Muthu *et al*., 2006). Omoruyi *et al*. (2012) found five different plant species used for treatment of diarrhoea in Eastern Cape of South Africa. In our study, seven plants (*Dicoma anomala* subsp gerraddi*, Ozoroa sphaerocarpa, Artemisia afra, Terminalia sericea, Schotia brachypetala, Geigeria aspera, Dicoma anomala* subsp anomala) are used for treatment of cough (Table 1). The use of Artemisia *afra* and *Geigeria aspera* for treatment of cough is also reported in Limpopo province for TB, ailment related to cough (Semenya and Maroyi, 2013). Leaves decoction of *A. afra* is administered orally to ease cough, it is believed that *A. afra* clear the respiratory and bronchial passages (Viljoen, 2007).

Six plants species are used for blood cleaning and most of them are from the family Fabaceae (*Albizia versicolor, Elephantorrhiza elephantina* and *Peltophorum africanum*), followed by two plant species from Hyacinthaceae family (*Drimia elata* and *Eucomis pallidiflora*). The use of *Drimia elata* and *Elephantorrhiza elephantina* for blood cleaning is consistence with other ethnomedicinal studies in Limpopo Province (Semenya *et al*., 2013). Other plants used for blood cleaning include *Hypoxis hemerocallideaa* and *Elaeodendron transvaalense* (Table 1). A Gastro intestinal ailment such as internal sore is treated using five plant species. Plants used to treat internal sores include *Aloe marlothii, Hypoxis hemerocallidea, Geigeria aspera and Ziziphus mucronata.*

It is also important to note that some of the plants are used for treatment of more than two ailments (Maroyi, 2013). These finding are in agreement with this study which shows that of all reported plants species in the study area 35% (14) are used to treat two ailments, 7.5% (3) treat three different ailments whereas 12.5% (5) can treat more than four ailments (Figure 4). For example, *Boscia albitrunca* is used to treat epilepsy and snake bites. *Solanum panduriforme* is documented for dental worms, external sore and wounds.

Hypoxis hemerocallidea is used to treat six different ailments (Table 1 and figure 4). Treatment of diarrhea and dysentery with *H. hemerocallidea* is validated through ethnobotanical studies by other ethnic groups and through phytochemical analysis. Bisi-Johnson *et al*. (2010) reported the use of *H. hemerocallidea* for diarrhea by Xhosa people in Eastern Cape of South Africa. The antidiarrhoeal activity of *H. hemerocallidea* was validated through phytochemical analysis (Ojewole et. al., 2009). Other ailments treated by *H. hemerocallidea* include hypertension, internal sores, stomach-ache, Kidneys problems and blood cleaner. The alternative use of medicinal plant is of benefits as it provides plant of choice to treat ailments. This also reflects rich ethnome-

dicinal knowledge employed by Bapedi traditional healer.

Preparation of remedies

Tradition healers normally prefer crude extract for medicinal preparation (Drewes *et al*., 2006). Various preparation methods, such as boiling, pounding and maceration are used by Bapedi traditional health practitioners. These are the most common methods of medicinal preparation used in South Africa (De Wet *et al*., 2012) and other African countries (Njoroge and Bussmann, 2009). Seventy three percent of the plant material in this study was boiled in water. De Wet *et al*. (2012) and Njoroge and Bussmann (2009) also noted the preference for boiling material. This might be due to the simplicity of preparation.

About 87% of remedies was prepared from only one species, 10% through a mixture of two different species, and in 3% of cases material from three plant species were combined to prepare a remedy. The practice of combing different species to treat ailments is a fairly common practice throughout South Africa. De Wet *et al*. (2012) reported this for the Zulu lay people, Semenya (2012) noted it for the Bapedi, and Tshisikhawe (2002) for the Venda area. Semenya (2012) further noted that Bapedi healers indicated that they combine species to re-enforce the medicines and increase its efficacy. This observation is in agreement with the study by Mabogo (1990) for Vha-Venda traditional health practitioners. It is interesting to note that pharmacological studies support this claim (Chow *et al*., 2003). This was further scientifically validated by Erasmus (2014), who showed that in some cases a combination mimics the broad spectrum antibiotics used in modern medicine.

The preference of a single species by Bapedi healers in the preparation of extracts might be linked to their local availability. In the Southern Tigray, Northern Ethiopia, Giday and Gobana (2010) postulated that the wide utilization of a single plant species in the preparation of indigenous remedies by healers is ascribed to the differences in the socio-cultural landscapes, indigenous knowledge on synergetic effect of different medicinal plants and vegetation types. Saikia *et al*. (2006) reported that use of a single species in the preparation of an extract could be of great interest for the development of novel drugs as the exploration of therapeutic activity-bearing ingredients may be easier. However, according to Semenya *et al*. (2013b), the use of a single species by Bapedi healers in the preparation of extracts has both advantages and disadvantages from a conservation point of view. As noted earlier when used to treat an ailment it reduces harvesting pressure of being multi-used, likewise the opposite increases harvesting, thereby posing a threat.

Mode of administration

A variety of methods are employed for administration of herbal medicine by Bapedi traditional health practitioners. However, findings from this study illustrate that oral self-administration (71.7%) was the method of choice. Studies such as Kambizi and Afolayan (2001) and Chigora *et al*. (2007) also noted that most medicines used in the treatment of various ailments are prescribed orally. The preference of this method by Bapedi traditional health practitioners might be due to the fact that medication in liquid form is already dissolved, so it can readily be absorbed by the human body (Semenya *et al*., 2013a).

Dosage

Conservation status

Although 82% of plant species documented in this study are categorised as Least Concern in the Red Data List of South Africa (SANBI 2012), species such as *Elaeodendron transvaalense and Drimia sanguine* are highly exploited for their perceived medicinal properties. These plants are declining in local and regional level respectively (Williams *et al*., 2013). This is in line with finding from this study, which noted that traditional health practitioners perceived these species as rare. Numerous studies such as Moeng and Potgieter (2011), Mathibela (2012) and Semenya *et al*. (2013b) alluded to the fact that healers in the Limpopo Province are unaware of Red Data-listed species, or species of special concern, or even species that are protected via various national and provincial legislations. This calls for urgent awareness programmes on the conservation status of medicinally used plants, as this could assist with natural resource management.

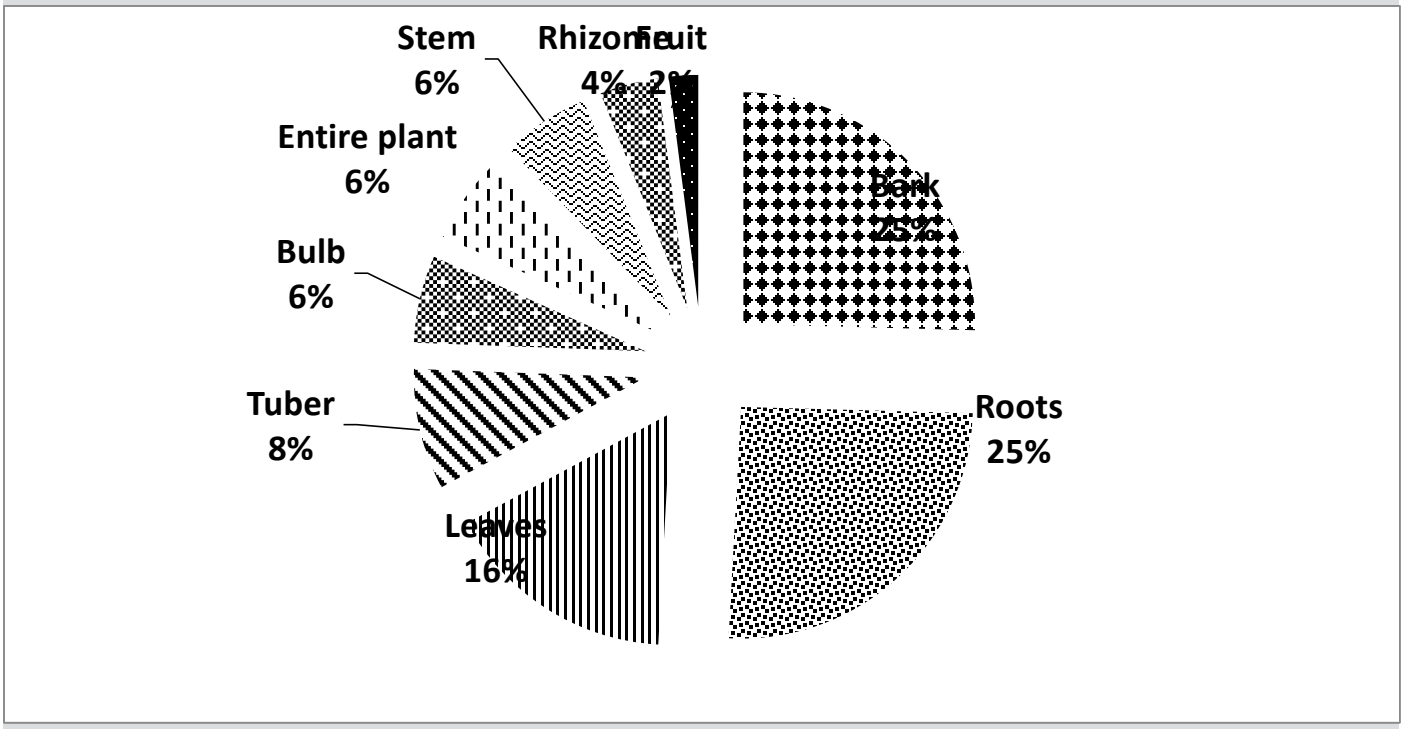

Figure 3. Plant parts used for medicinal preparation.

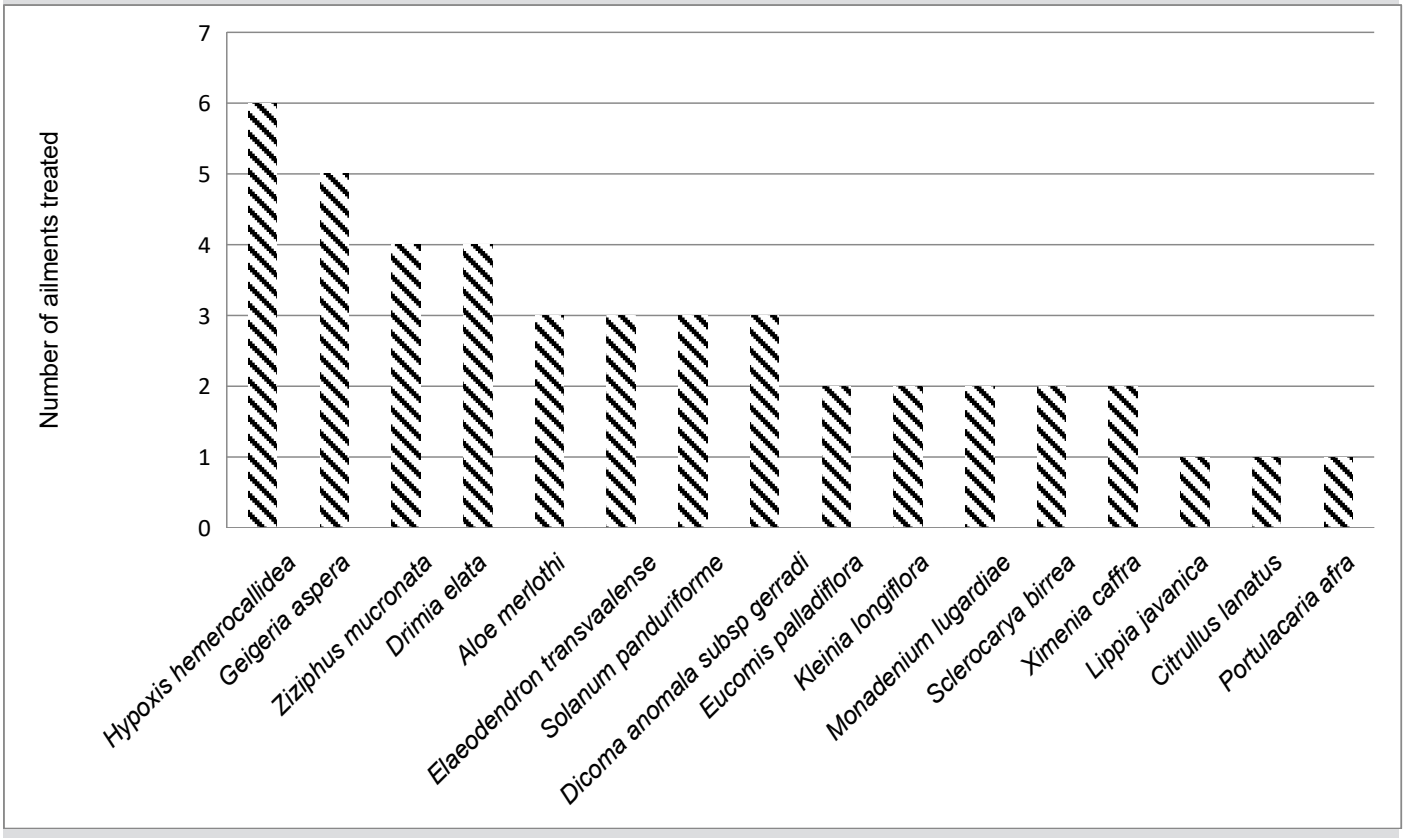

Figure 4: Number of ailments treated by documented plant species.

CONCLUSIONS

Traditional medicine plays an important role in primary health care of Mogalakwena residents. The large number of species employed to treat a variety of ailment clearly reflects the rich diversity of treatment protocols used by Bapedi healers. Further studies to determine the efficacy of some of the recorded species against the reported ailment is strongly recommended.

ACKNOWLEDGEMENTS

All traditional health practitioners who participated in this study are highly acknowledged for sharing their knowledge. The University of Limpopo is acknowledged for financial support.

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Table 1: Plant species used to treat various ailments and their mode of administration in Mogalakwena municipality, Waterberg District, South Africa

Family name and Scientific name	Voucher	Vernacular name	Parts used	Ailment treated	Preparation	Mode	Administration	Status (SANBI)
Asparagaceae								
Asparagus sauveolens LC Burch.	UNIN 12215	Unknown	Roots	Immunization	Infusion*	Orally	Remedy is mixed with stem infusion of *Adenia glauca,* 6 teaspoons a day for Infants	
Anacardiaceae								
Sclerocarya birrea (A.Rich.) LC Hochst. subsp. caffra (Sond.)	UNIN 12304	Morula	Bark	Kidney	decoction	Orally	1 full cup is taken twice a day	
	Kokwaro			Vomit	Infusion	Orally	1/2 cup is taken thrice a day	
Ozoroa sphaerocarpa LC R.Fern. & A.Fern.	UNIN 12323	Monoko	Roots	Nasal block	Decoction	Orally	Plant is mixed with root decoction of *Solanum panduriforme,* 1 teaspoon twice a day.	
Asphodelaceae								
Aloe marlothii A.Berger LC	UNIN 12302	Kgopha ya thaba	Roots Leaves Leaves	Drop Wounds Internal sore	Decoction Paste Decoction	Orally Topically Orally	1 full cup taken twice a day Plant paste id applied on wounds 1/2 cup taken thrice a day	
Asteraceae								
Artemisia afra LC Jacq. ex Willd. var. afra	UNIN 12222	Lengana	Entire plant	Cough	Decoction	Orally	300ml decoction is administered thrice a day.	
Dicoma anomala Sonds LC subsp gerraddi	UNIN 12300	Phela	Tuber	Asthma	Powder	Orally	1/4 teaspoon is mixed with tablespoon of oil and taken thrice a day	
				TB/ whooping cough	Squeeze	Orally	Squeezed juice is mixed with powdered *Ozoroa sphaerocarpa (*bark),1 tablespoon twice a day	
Dicoma anomala LC subsp anomala.	UNIN 12299	Phela ya thaba	Bark	Skin rush	Infusion	Orally	½ teaspoon powder is served in 300ml	
				Cough	Infusion	Orally	½ cup taken twice a day	
Geigeria aspera Harv. var. LC aspera	UNIN 12314	Makgontšohle	Leaves	Flu	Burnt	Smoked	Rolled leaves are smoked twice a day	

				Roots	Infertility	Infusion*	Orally	2 cups taken twice a day for a week
				Entire plant	Stomachache	Infusion	Orally	3 cups taken thrice a day for a week
					Body pains	Decoction	Orally	1 full cup taken twice a day
					Internal sores	Decoction	Orally	1/2 cup once a day for period of a week
	Klenia longiflora	DC.	UNIN 12206	Mmale	Stem	Earache	Infusion	Ear drops	Plant stem is crushed and mixed with Water, further is used for 2 ear drop.
cold	LC					Sore eyes	Infusion	Bathing	Remedy is used to bath eyes twice a day
Bignoniaceae								
Kigelia Africana		UNIN 12209	Unknown	Pod/bark	HIV/AIDS	Infusion*	Orally	300ml cup infusion is taken thrice a day
LC (Lam.) Benth.								
Boraginaceae								
Ehretia rigida (Thunb.) Druce		UNIN 12311	Moroberobe	Roots	Arthritis	Decoction	Orally	Plants roosts are crushed; 300ml is administered thrice a day (orally).
LC subsp. nervifolia Retief & A.E.van Wyk								
Capparaceae								
Boscia albitrunca (Burch.)		UNIN 12221	Motlopi	Bark	Epilepsy	Foam	Orally	Foam is taken twice a day until ailment subside
LC	Gilg & Gilg-Ben.					Snake bites	Infusion	Orally	1L of mixture is taken once a day
Celastraceae								
Elaeodendron transvaalense		UNIN 12321	Monamane	Bark	Fever	Infusion*	Orally	1 full cup twice a day for a week
NT	(Burtt Davy) R.H.Archer			Roots	Blood cleaner Stomach-ache	Decoction	Orally	1 full cup taken twice a day for period of a week
Combretaceae								
Combretum apiculatum		UNIN 12204	Moruba	Bark	Child Vomit	Infusion	Orally	2 teaspoon of is administered twice a day (orally)
LC Sond.subsp. apiculatum								

Terminalia sericea LC Burch. ex DC.	UNIN 12212	Mohonono	Roots Bark	Cough Wounds	Decoction Paste	Orally Topically	3 teaspoons are taken thrice a day Plant bark is chewed and placed on wounds
Cucurbitaceae							
Citrullus lanatus (Thunb.) LC Matsum. Aand Nakai	UNIN 12315	Legapu	Roots	Infertility	Infusion	Orally	Plant roots are pounded and taken with soft porridge, thrice a day.
Dracaenaceae							
Sansevieria hyacintholdes LC (L.) Druce	UNIN	Molomo mokhoda	Entire plant	Painful legs	Infusion*	Bathing	Prepared remedy is administration through leg massage
Euphorbiaceae							
Croton gratissimus LC *Burch. var. gratissimus*	UNIN 12207	Mohologa	Roots	Complexion	Powder	Topically	Powdered roots are mixed with body lotion and is applied on the skin twice a day
			Bark	Sore throat	infusion*	Rinse	Remedy is taken twice a day for throat rinsing but the water should not be swallowed.
Monadenium lugardiae NE N.E.Br.	UNIN	Mošhitša	Stem	Stomachache/ Food poison	Squeeze	Orally	One drop is swallowed, caution plants is said to be poisonous
Fabaceae							
Albizia versicolor LC Welw. ex Oliv.	UNIN 12216	Unknown	Bark	Blood cleaning	Decoction	Orally	300ml bark decoction administered thrice a day
Elephantorrhiza elephantina LC (Burch.) Skeels	UNIN 12310	Mositsane	Rhizome	Blood cleaning	Decoction	Orally	1/2 cup taken thrice a day
Peltophorum africanum LC Sond.	UNIN 12319	Mosehla	Bark	Blood cleaning Indigestion	Infusion Infusion	Orally Orally	300ml cup is taken thrice a day
Schotia brachypetala Sond. LC	UNIN 12313	Molope	Bark	Cough Leaver failure	Decoction Decoction	Orally Orally	1/2 cup is taken thrice a day 1 full cup taken thrice a day
Hyacinthaceae							
Drimia elata	UNIN 12301	Sekanama se	Bulb	Back pain&	Decoction	Orally	½ cup decoction taken thrice a day

DDT Jacq.		khubedu		Blood cleaner			
				Muscle pains	Paste	Topically	Handful bulb is crashed and rubbed on body muscle
affected							
				Internal sore	Infusion	Orally	1/2 tablespoon powder with 300ml;
taken twice							a day
Drimia sanguine	UNIN 12307	Sekanama se	Bulb	Painful Legs	Decoction	Bathing	Decoction is applied twice a day
NT (L.F) Kr Gawl		tsheu					
Eucomis pallidiflora	UNIN 12326	Mathuba difala	Bulb	Blood cleaner	Decoction	Orally	1/2 cup is taken twice a day
NT Baker subsp. pole-evansii				Gonorrhoea	Decoction	Orally	1 full cup is taken thrice a day for a week
(N.E.Br.) Reyneke ex J.C. Manning							
Hypoxidaceae							
Hypoxis hemerocallidea	UNIN 12327	Titikwane	Tuber	Diarrhea,	Decoction	Orally	1 full cup taken twice a day for period of
DC Fisch., C.A.Mey. & Avé-Lall.				Stomachache			a week
				Kidney, blood cleaner and hypertension	Decoction	Orally	1 full cup is taken once a day
				Internal sores			
Mesembryanthemaceae							
Carpobrotus eduli (L.)	UNIN 12213	Chip	Leaves	Toothache	Fresh	Sublingually	Plant leaves are chewed twice a day
LC L.Bolus subsp. edulis							but not swallowed
				Earaches	Burnt	Ear drop	Plant leaves are burned on a stove, 2 drops
.							in the ear
Olacaceae							
Ximenia caffra	UNIN 12210	Motšhidi	Roots &	Uncontrolled	Decoction	Orally	1L decoction is mixed with gum and
LC Sond. var. caffra			gum	menstruation			administrated for 1 day
				Infertility	Decoction	Orally	Plant is mixed with decoction from *Ziziphus mucronata and Datura stromanium, 1/2cup taken thrice a day*

Pedaliaceae							
Dicerocaryum eriocarpum LC (Decne.) Abels LC	UNIN 12211	Lepati	Roots	Womb cleaner	Decoction	Orally	Plant is mixed with decoction of *Bidens pilosa* 300ml decoction is taken thrice a day
Portulacaceae							
Portulacaria afra Jacq. LC	UNIN 12202	Unknown	Leaves	Hypertension	Infusion	Orally	full cup infusion is administered thrice a day
Passifloraceae							
Adenia glauca Schinz LC	UNIN 12047	Monna a ga apare	Stem	Swollen legs	Infusion*	Bathing	3-5 liter hot infusion is used for leg massaging and is applied twice a day
Rhamnaceae							
Ziziphus mucronata LC Willd. Subsp. mucronata	UNIN 12218	Mokgalo	Roots	Uncontrolled Menstruation Infertility and internal sores	Decoction	Orally	½cup decoction is administered thrice a day
			Leaves	Wounds	Paste	Topically	Remedy is applied on wounds
Solanaceae							
Solanum panduriforme LC	UNIN	Thola	Fruit	Dental worms	Burnt	Sublingually	Smoke is kept in the mouth until dental worms subside, twice a day
				External sore/ Wound	Paste	Topically	Paste is applied on the sores and wounds twice a day
Verbenaceae							
Lippia javanica (Burm.f.) LC Spreng.	UNIN 12309	Moshinkwane	Leaves	Flu	Decoction	Orally	1/2 cup taken twice a day until ailment Subside

*During preparation of medicine, water was used as a solvent. In some instances cooking oil was mixed with powdered plant part as a preparation method. Infusions were prepared by either hot or cold water, superscript(*) represent hot infusion and lack of superscript (*) is cold infusion

*Status of plant species was assessed using threatened species programme of National red list categories from South African National Botanical Institute (SANBI). The categories are used to measure the species' risk of extinction in the wild. The specie is considered least concern (LC) when is wide spread and abundant. It Is considered not evaluated (NE) when is has never been assessed on the criteria, and some are not evaluated because they are naturalised exotics and are included in Plants of Southern Africa. Plant is considered Data Deficient - Taxonomically Problematic (DDT) when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible. It is considered to be Declining (DC) when it does not qualify for