



An ethnobotanical survey of indigenous knowledge on medicinal plants used by the traditional healers of the Lwamondo area, Limpopo province, South Africa



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ABSTRACT

The use of medicinal plants in the treatment and prevention of diseases is attracting the attention of scientists worldwide. Approximately 3000 plant species are currently used by an estimated 200,000 indigenous traditional healers in South Africa. The specific part of the plant used for medicinal applications varies from species to species, and from one traditional healer to another. This study was carried out to explore and record those plants and plant parts used for treating various human ailments by the traditional healers of the Lwamondo area in the Limpopo province, South Africa for medicinal purposes. Ethnobotanical data were collected from 30 traditional healers (24 females and 6 males) in the Lwamondo area of Venda, by means of a data capture questionnaire focusing on the local names of the medicinal plants, their medicinal uses, the plant parts used, and methods of preparation and of administering treatments to patients. The survey identified 16 medicinal plants from 7 families, with 14 genera, used to treat a range of ailments in the Lwamondo area. The Fabaceae family was the most commonly used plant family representing 43.8% of all the medicinal plants species recorded by this study, followed by the Varbenaceae family at 18.8%. The plant parts most frequently used were the roots (44.5%), followed by the leaves (25.9%), bark (14.8%), the whole plant (11%), and flowers (3.7%). Most of the traditional healers obtained their extracts by boiling the medicinal plants. The most often recurring ailment treated by healers was stomach problems, using 31.3% of all the medicinal plants reported in this study for preparing such treatments. The following medicinal plants were covered by this study: *Annona senegalensis*, *Schkuhria pinnata*, *Diospyros mespiliformis*, *Piliostigma thonningii*, *Senna obtusifolia*, *Bauhinia galpinii*. The rural communities of the Lwamondo area possess a wealth of information on medicinal plants and their applications. This ethnobotanical survey can help scientists identify for further research those plants whose medicinal properties may be useful in the development of new drugs.

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1. Introduction

According to the World Health Organization (2008), the term “traditional medicine” is to be understood as the sum total of the knowledge, skills and practices based on theories, beliefs and experiences indigenous to different cultures that are used to maintain and improve health, as well as to prevent, diagnose, and treat physical and mental illnesses. The World Health Organization has a keen interest in documenting the use of medicinal plants by native peoples from different parts of the world (Buragohain, 2011).

Across the world and throughout the ages plants have traditionally played a major role in the treatment of human diseases (Thirumalai et al., 2009). The use of herbal remedies as an adjunct or alternative to conventional medicine is also becoming increasingly popular all over the world. It is estimated that 80% of the South African population will

use a traditional remedy at some stage during their lifetime (Lewu and Afolayan, 2009).

According to Cheikhoussef et al. (2011), there are several advantages for people in rural areas in opting for traditional medicine: traditional healers are usually to be found within relative close proximity to their homes, they are familiar with the patient's culture and environment, and the costs associated with such treatments are generally negligible.

South Africa is blessed with a rich cultural diversity which is reflected in the formal and informal systems of medicine that are presently practised in different parts of the country (Van Wyk et al., 1997). Traditional medicine is well-established in South Africa as a recognized form of healing, with the different communities using a wide variety of plants for the treatment of various ailments (Samie et al., 2005). The Venda region of South Africa, situated in the far North of the country, and which still remains most rural in character, has a very strong tradition of medicinal plant usage (Samie et al., 2005).

Traditional healers are generally divided into two categories, namely diviner diagnosticians (or diviner mediums) and healers (or herbalists) (Richter, 2003). Traditional healers are found in most

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indigenous rural societies and generally enjoy a high social standing in their communities, and thus usually have considerable influence on local health practices; it may therefore be worthwhile to explore the possibilities of engaging them in support of primary health care initiatives (Cheikhyoussouf et al., 2011).

Indigenous knowledge of using medicinal plants for healing human ailments is, however, in danger of gradually becoming extinct, because this knowledge is passed on orally from generation to generation without the aid of a writing system and because many traditional healers do not keep written records (Kaido et al., 1997).

Most cultures possess a huge store of undocumented traditional knowledge of applying herbal remedies in the treatment of diseases (Offiah et al., 2011). It has now become more important than ever to record and preserve the traditional knowledge on medicinal plants, in order to aid the discovery of new drugs and possibly to find improved applications of traditional medicine (Koné and Atindehou, 2008). In addition, documenting the results of scientific research into traditional medicine may also help conserve an important part of an indigenous people's cultural heritage for future generations.

Ethnobotany and ethnomedical studies are today recognized as the most effective method of identifying new medicinal plants or refocusing on those plants reported in earlier studies for the possible extraction of beneficial bioactive compounds (Thirumalai et al., 2009). The need for continued ethnobotanical research to find and document important medicinal plants cannot be over-emphasised (Wintola and Afolayan, 2010). This study explores the medicinal plants used by the vhaVenda people for the treatment of various ailments, and the resulting record of these plants and their uses provides baseline data for future phytochemical and pharmacological studies.

2. Materials and methods

2.1. Study area

The Limpopo province (Fig. 1a) is situated within the greater savanna biome, commonly referred to as bushveld in South Africa, with relatively small sections of neighbouring grassland and forest biomes found at the province's Western and Eastern extremities respectively. The province is rich in mineral deposits, as well as other natural and botanical resources.

The study was conducted in the Lwamondo area (Fig. 1b) situated in the Vhembe district (Fig. 1b) in that part of the Limpopo province traditionally inhabited by the Venda people, or the vhaVenda (Fig. 1a). Although the greater Limpopo province (Fig. 1a) is populated by numerous other ethnic groups, they all share a deep-seated attachment to their own particular traditions and cultural values. The vhaVenda comprises a number of distinctive clans, namely the Mutovhele (ndevehle), Ndou, Ngona, Singo, Kwindu, Vhakwevho, Vhadu, Vhalaudzi and Vhalemba (Singo, 1996). The Lwamondo area (Fig. 1b) was chosen for this project, because the traditional healers practicing their craft over there still adhere to their people's age-old traditional beliefs and customs, and, as such, they constitute an authentic source of data for the scientific documentation of medicinal plants still in everyday use.

2.2. Ethnobotanical data collection

A search of traditional healers in the whole of the Lwamondo area was conducted with the prior permission of and referrals by the community leaders of each clan. Researchers started their interaction with each prospective respondent by first explaining the aims and objectives of the project in order to solicit their consent and co-operation before any ethnobotanical data were gathered. During these discussions the researchers emphasised the immense value which each traditional healer's contribution could make to the compilation of a record of traditional knowledge of medicinal plants in the Lwamondo area.

With the help of an interpreter, all interviews and discussions were conducted in tshiVenda, the local language. The ethnobotanical data for this research were gathered from altogether 30 traditional healers, 28 diviner diagnosticians (23 females and 5 males), and 2 herbalists/healers (1 female and 1 male). Ethnobotanical data were collected by means of a pre-set data capture questionnaire and open interviews. The questionnaire was designed to focus on the local names of plants, their various medicinal applications, the parts of the plant used, and the methods of preparation and administering treatments to patients. Everyone in the target population who agreed to participate was interviewed. Some traditional healers were prepared to identify no more than five medicinal plants and their uses. These healers informed the research team that they were unwilling to divulge information about certain medicinal plants, the properties of which they considered to be very powerful. They clearly wished to keep this knowledge to themselves as something belonging to their own private domain. The ability to use plants of such purported potency apparently serves as these healers' speciality trade marks in their communities, conferring upon them the status of being the best among their peers. According to custom, the collection of some of these medicinal plants must first be preceded by the appropriate rituals and may only be harvested by men.

Frequency index was calculated and recorded in Table 1. Frequency index is a mathematical expression of the percentage of frequency of mentioning for a single botanical species by informants. The following formula was used to calculate frequency index\:

$$FI = FC/N \times 100$$

where FC is the number of informants who mentioned the use of the species, and N is a total number of informants (Madikizela et al., 2012). N = 30 in this study. The frequency index was high when there were many informants who mentioned a particular plant and low when there were few reports.

2.3. Plant collection

Herbarium specimens were taken from the medicinal plants of interest which had been collected from natural vegetation and home gardens. A photograph and a herbarium specimen of each plant were taken *in situ* for proper identification of the medicinal plants of interest. Data on each plant were recorded by using the data capture form.

2.4. Taxonomic identification

Some of the medicinal plants were identified in the field and the remaining ones were identified through a literature review. After identifying the medicinal plants, the herbarium specimens were taken to the South African National Biodiversity Institute (SANBI) for comparison and verification of each plant's scientific name. A unique voucher specimen number was assigned to each herbarium specimen (Table 1). (The herbarium specimens will be donated to the SANBI after the completion of this research.)

3. Results and discussion

It was found that among the 30 respondents who were interviewed, the majority was falling within the age range of 60–69 years (Fig. 2), this is because most of the traditional healers found in the Lwamondo, Limpopo province of South Africa are older people.

The plants' family names, botanical names, vernacular names, voucher specimen numbers, plant forms, plant parts used, and methods of preparation and of administering treatments appear in Table 1. The study revealed 16 plant species from 7 families that are used for medicinal purposes by the traditional healers of the Lwamondo area, with the

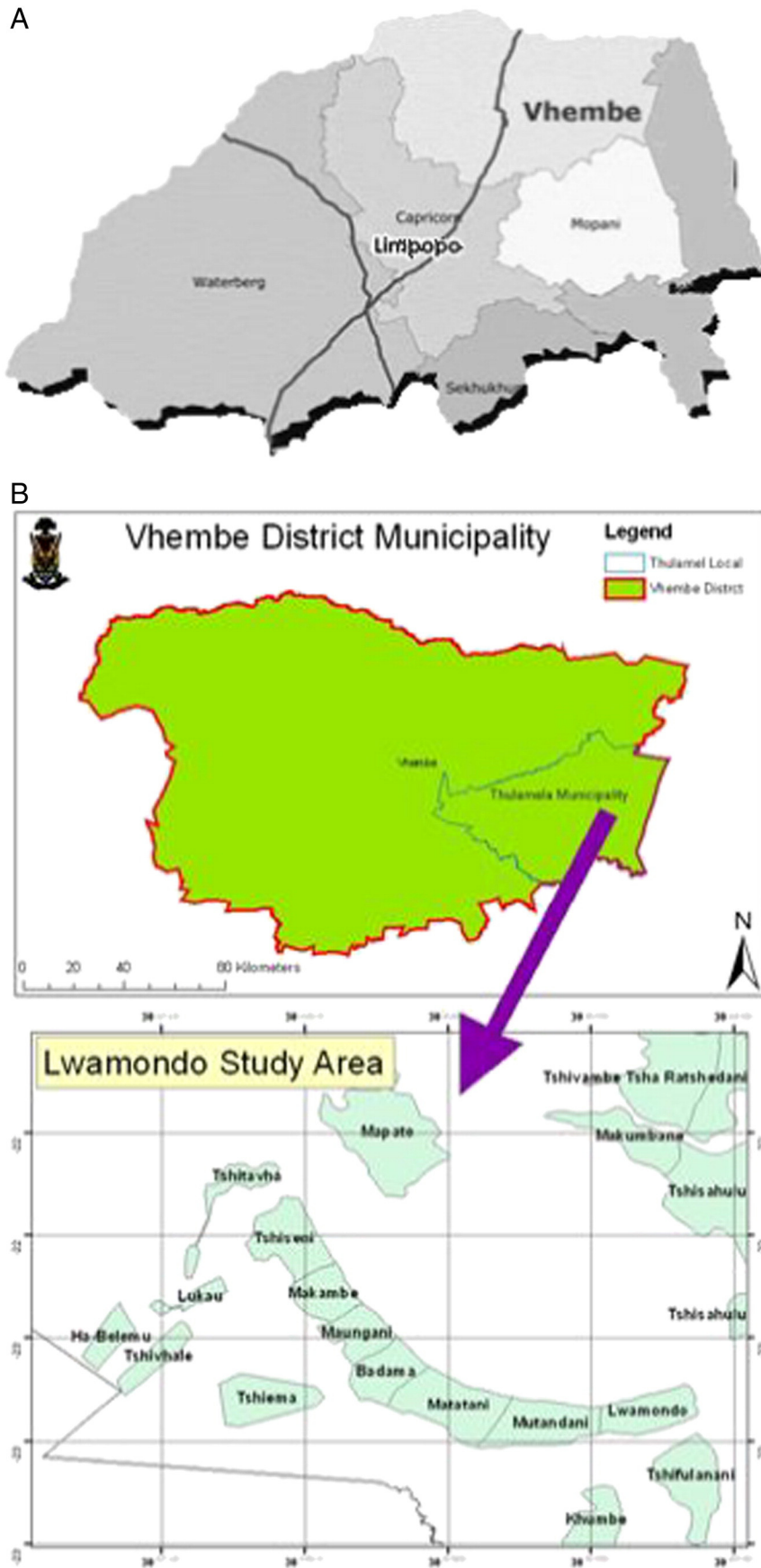


Fig. 1. a: Map showing Limpopo province and Vhembe district. b: Map showing Vhembe district and the Lwamondo study area.

Table 1
Ethnobotanical information of medicinal plants used to cure various ailments in Lwamondo area, Limpopo province, South Africa.

Family	Scientific name	Vernacular name	Voucher specimen number	Plant form	Plant part used	Forms of preparation	Frequency index
Annonaceae	<i>Annona senegalensis</i> Pers.	Muembe	STM13	Shrub/ small tree	Roots, bark, or leaves	Roots are boiled and the mixture drunk for stomach problems, infertility, improved sexual performance, pains during pregnancy, fever, or oedema. The bark is boiled and drunk for oedema, stomach problems, or easy labour. Leaves are boiled and the mixture is used to make a soft porridge for alleviating stomach problems in babies.	30
Asteraceae	<i>Ageratum conyzoides</i> L.	Unknown	STM07	Herb	Leaves	Leaves are soaked in cold water for 3 days and the mixture drunk by HIV positive patients to boost their immune systems.	3.3
	<i>Schkuhria pinnata</i> Lam.	Luswielo	STM01	Herb	Whole plant, leaves, or roots	The whole plant is boiled and the mixture drunk for treating diabetes, hypertension, stomach problems, oedema, or gonorrhoea. Roots or leaves are chewed and swallowed for dysmenorrhoea.	30
Ebenaceae	<i>Diospyros mespiliformis</i> Hochst. Ex A. DC.	Musuma	STM09	Tree	Bark	The bark is boiled and the blend drunk for stomach problems, to stop vomiting or diarrhoea.	10
Fabaceae	<i>Piliostigma thonningii</i> (Schumach) Milne-Redhead	Mukolokote	STM15	Tree	Roots, leaves, or bark	Roots are boiled and the mixture drunk to treat loss of appetite, or used to make a soft porridge for alleviating stomach problems. Leaves are boiled and the mixture drunk for stomach problems. The bark is boiled to make a soft porridge for the treatment of haematochezia.	13.3
	<i>Senna petersiana</i> (Bolle) Lock	Munembenembe	STM11	Shrub/ small tree	Roots	Roots are boiled and the mixture drunk for treating infertility, dysmenorrhoea, or syncope.	16.7
	<i>Senna obtusifolia</i> L.	Mutsheketsheke	STM08	Herb	Roots	Roots are boiled and the mixture drunk for treating swollen penis, stomach problems, or dysmenorrhoea.	6.7
	<i>Bauhinia galpinii</i> N.E.Br.	Mutswiriri	STM14	Shrub	Roots	Roots are boiled and the mixture drunk for improved sexual performance, or for treating stomach worms. The mixture can be used to make a soft porridge for stomach pains.	10
	<i>Erythrina lysistemon</i> Hutch.	Muvhale	STM10	Tree	Bark	The bark is boiled and the compound drunk for improved sexual performance, or for relieving oedema.	6.7
	<i>Mucuna coriacea</i> Bak. Subsp. Irritans	Mulada	STM03	Herb	Roots	Roots are boiled and the mixture drunk as a contraceptive, or mixed with salt and gargled for toothache.	6.7
	<i>Caesalpinia decapetala</i> (Roth.) Alston	Luanakha	STM02	Shrub	Roots	Roots are boiled and the mixture drunk for treating dysmenorrhoea.	3.3
Orobanchaceae	<i>Striga asiatica</i> (L.) Kuntze	Vhuri	STM06	Herb	Whole plant, or roots	The whole plant is burned and the preparation is inserted rectally for treating haemorrhoids, or the smouldering smoke is used to kill off warts, or the charred remains are used as a dressing on wounds to dry, or rubbed on legs for oedema. The whole plant is boiled and the mixture drunk for hematochezia. Roots are boiled and the paste is padded on legs for oedema.	23.3
Oxalidaceae	<i>Oxalis semiloba</i> Sond. Subsp. Semiloba.	Mupurungwane	STM12	Herb	Whole plant, or leaves	The whole plant is crushed and inserted rectally for the treatment of haemorrhoids. Juice from the crushed leaves is used as eye drops for treating eye problems (tearing).	6.7
Verbanaceae	<i>Lantana camara</i> L.	Tshidzimbampotolo	STM04	Herb	Roots, or leaves	Dried roots are burned and smoked over private parts for dysmenorrhoea. Leaves and roots are boiled and the mixture drunk for treating kwashiorkor.	6.7
	<i>Lantana rugosa</i> Thunb.	Tshidzimbavhalesa	STM16	Herb	Roots	Roots are boiled and the mixture drunk to bring down fever.	3.3
	<i>Phyla nodiflora</i> L. Greene var. <i>Rosea</i> (D. Don)	Tshishengelaphofu	STM05	Herb	Flowers, leaves, or roots	Flowers, leaves or roots are chewed and spit out for treating oral thrush.	6.7

Fabaceae family being the dominant family (43.8%) (Fig. 3). The roots (44.5%) are the plant part most commonly used, followed by the leaves (25.9%), bark (14.8%), the whole plant (11%) and flowers (3.7%) (Fig. 5). Herbs are the plant form used most frequently (56.3%) (Fig. 4) for the treatment of ailments such as diabetes, hypertension, stomach problems, oedema, gonorrhoea, dysmenorrhoea and toothache (Table 1).

None of the respondents mentioned any side effects caused by any of the medicinal plants listed in Table 1. All in all, these plants are used for the treatment of 26 types of ailments. Most of the traditional healers obtain their extracts by boiling the medicinal plants (Table 1). Their methods of administering treatments vary from drying and burning the plants for treating warts with the smoke, to inserting the remedy rectally for haemorrhoids. In the case of oedema the plant extracts are ingested orally or padded on the legs as a poultice.

All plant species identified by this study have local vernacular names, except for *Ageratum conyzoides*, which is referred to by some traditional healers as Mutungwi.

The traditional healers usually collect the plants in the field, dry and crush them, before storing the plant material in bottles; this is often done to prevent patients from recognizing the plants being used for their treatment, which may sometimes be a seemingly ordinary plant growing in their gardens or across the street or in the field. Some healers prefer storing plant material in powdered form in bottles to reduce the number of field collection trips they may otherwise be obliged to undertake or to store up inventory for times when some plants may be seasonably unavailable, so as to be able to offer treatments throughout the year.

According to the frequency index, *Annona senegalensis* and *Schkuhria pinnata* were the most used plant species, having a frequency index of

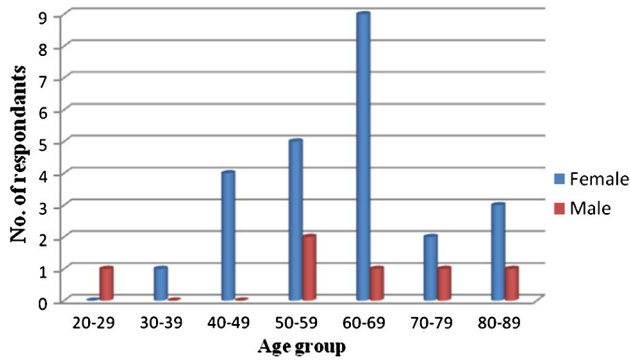


Fig. 2. Number of traditional healers by age category and gender, in Lwamondo, Limpopo province of South Africa.

30% each, while *A. conyzoides*, *Caesalpinia decapetala*, and *Lantana rugosa* were the least utilised with a frequency index of 3.3% each (Table 1).

The medicinal plants recorded in the target area were found to belong to the following families: Fabaceae (43.8%), Verbanaceae (18.8%), Asteraceae (12.5%), with Annonaceae, Ebenaceae, Orobanchaceae and Oxolidaceae each comprising 6.3% of the overall total (Fig. 3).

The most commonly used plant forms were herbs (56.3%), trees (18.8%), shrubs (12.5%) and plants that could be considered to be either a shrub or a small tree (12.5%) (Fig. 4). The choice of use for a specific plant form is based on knowledge passed on from one generation to the next.

A tree is a woody plant, usually with a single stem, which can grow to a height of 6 m or more (Venter and Venter, 2002). A shrub is a woody plant, usually no taller than 2 m, but the distinguishing factor is that it has a very short stem with numerous thin branches near the ground and it never grows into a single-stemmed tree (Roodt, 1998). An herb is a plant which does not develop persistent woody tissue above ground and either dies at the end of the growing season or overwinters by means of underground organs (Van Wyk and Malan, 1998).

The plant parts most commonly used were the roots (44.5%), leaves (25.9%), bark (14.8%), the whole plant (11%) and flowers (3.7%) (Fig. 5). The roots are favoured because of their availability throughout the year. Roots are also traditionally considered to be “strong medicine”.

Medicinal plants are most often used for the treatment of stomach ailments (37.5%), followed by dysmenorrhoea (menstrual pains) (31.3%), oedema (swollen legs) (25%), reduced sexual performance and hematochezia (blood in faeces) (18.8%) fever, infertility and haemorrhoids (piles) (12.5%), while the following complaints, namely pain, immune system deficiencies, diabetes, blood pressure abnormalities, gonorrhoea, vomiting, diarrhoea, loss of appetite, syncope (dizziness), swollen penis, need for contraception, toothache, warts, dry wounds, eye problems, kwashiorkor, oral thrush and ensuring easy child birth, all recorded an incidence rate of 6.3% each (Fig. 6).

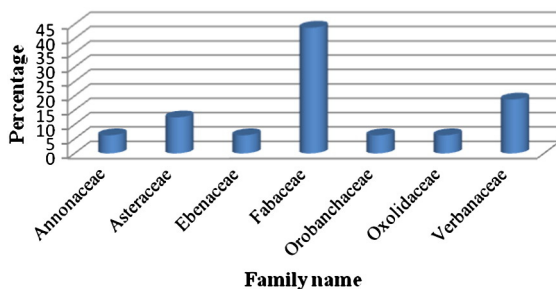


Fig. 3. Family representation of plant used in Ethnobotany in Lwamondo, Limpopo province of South Africa.

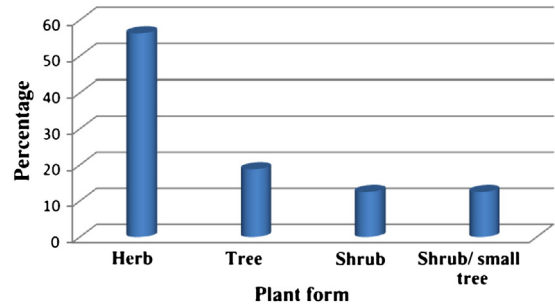


Fig. 4. Plant form representation of plant used in Ethnobotany in Lwamondo, Limpopo province of South Africa.

Because traditional knowledge of the healing properties of plants has since time immemorial been transmitted by oral instruction to carefully chosen initiates from one generation to the next, the recording and preservation of that knowledge in writing have become of vital scientific and cultural importance. This need is further underscored by the relatively advanced age of the small number of people with whom the bulk of this knowledge currently resides, because the danger exists that they may pass away perhaps without transmitting their unique knowledge to the younger generation: indeed, the study showed that local adults in the age bracket 20–49 (Fig. 2) had very little knowledge about the craft of traditional healing.

3.1. Medicinal plants uses: supporting literature evidence, additional anecdotes, and new findings

3.1.1. Annonaceae

Samie et al. (2005) report cases where the essential oils from the leaves of *A. senegalensis* are used for treating venereal disease, diarrhoea, and dysentery. According to Chinsebu and Hedimbi, 2010, the roots are used to treat herpes zoster and cryptococcal meningitis. Additional anecdotes were added from the study (Table 1).

3.1.2. Asteraceae

A. conyzoides is used in Nigeria for dressing wounds and ulcers, for craw-craw and as an eyewash (Sofowora, 1982). Additional anecdotes were added from the study (Table 1).

In the case of *S. pinnata*, the whole plant is used as an abortifacient and as a contraceptive (Van Wyk and Gericke, 2000). Additional anecdotes were added (Table 1).

3.1.3. Ebenaceae

Mabogo (1990) reports that *Diospyros mespiliformis* is used to treat a number of ailments: the bark, leaves and roots help stop bleeding, heal wounds and treat ring worm infestation, dysentery and fever; they are also used as a remedy for leprosy; and the crushed fruit is applied to treat fungal infection of the scalp. A study by

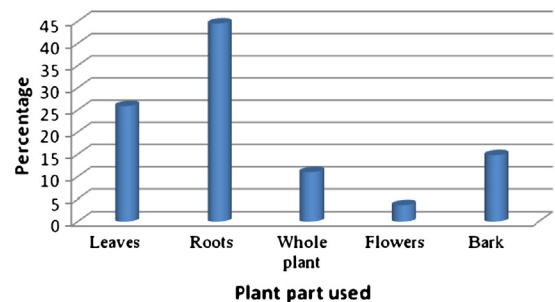


Fig. 5. Percentage use of plant parts used in Ethnobotany in Lwamondo, Limpopo of South Africa.

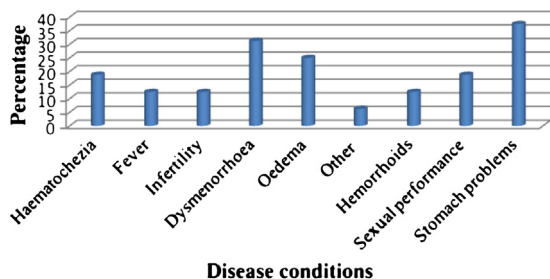


Fig. 6. Frequency, by percentage, of the types of medical conditions treated by the use of medicinal plants in Lwamondo, Limpopo province of South Africa.

Cheikhoussef et al. (2011) reports that the plant is used to treat male erectile dysfunction. The bark or leaves are steamed to treat malaria (Chinsebu and Hedimbi, 2010). Additional anecdotes were added (Table 1).

3.1.4. Fabaceae

According to Mabogo (1990), *Bauhinia galpinii* is used for treating diarrhoea and infertility, using the bark and the leaves. The roots are used for treating infertility (Steenkamp, 2003). Van Wyk and Gericke (2000) state that the seeds are used for the treatment of amenorrhoea. Additional anecdotes were added (Table 1).

Erythrina lysistemon leaves are crushed to treat sores, and open wounds are treated with powdered burnt bark. The leaves are used to prepare drops to treat earache, while a preparation made from the roots is used to treat sprains (Coates Palgrave et al., 2000). Open wounds may be treated with powdered burnt bark; infusions of the leaves are used as ear drops for relieving earache; and decoctions of the roots are used for sprains. The vhaVenda use the bark for toothache (Van Wyk and Gericke, 2000). Additional anecdotes were added (Table 1).

The use of the roots *Mucuna coriacea* is reported by Samie et al. (2005) as a treatment for toothache; this finding is supported by a study done by Mabogo (1990), which confirms that the root fibres are crushed to treat toothache by pressing the paste on the affected area. The roots are further used to treat fever and diarrhoea (Bessong et al., 2005). This study also indicates that the roots are used for toothache and additional anecdotes indicating their use as a contraceptive have been recorded (Table 1).

An infusion made from soaked roots of *Piliostigma thonningi* is used to make a soft porridge for stomach ailments in infants (Mabogo, 1990). The study shows that the roots are used for making a soft porridge to be ingested together with the infusion to treat stomach problems. Additional anecdotes were added (Table 1).

The roots of *Senna petersiana* are, according to Samie et al. (2010), used as an aphrodisiac, and for the treatment of gonorrhoea, syphilis, stomach ache and epilepsy. This study indicates that the roots are used as a cure for infertility, supporting Mabogo's study done in 1990 and additional anecdotes have been added in Table 1.

Senna obtusifolia, there is no previously known documented scientific literature on the medicinal applications of this plant species. New findings of the plant species' medicinal uses from the study were recorded in Table 1.

C. decapetala, there is no previously known documented scientific literature on the medicinal applications of this plant species. New findings of the plant species' medicinal uses from the study were recorded in Table 1.

3.1.5. Orobanchaceae

Striga asiatica, there is no previously known documented scientific literature on the medicinal applications of this plant species. New findings of the plant species' medicinal uses from the study were recorded in Table 1.

3.1.6. Oxalidaceae

Fresh leaves of *Oxalis semiloba* are chewed by a person suffering from a tart or sour feeling, usually after eating unripe fruit (Mabogo, 1990). Additional anecdotes were added (Table 1).

3.1.7. Verbanaceae

In the case of *Lantana camara*, the fresh leaves are used for eye injuries or painful eyes (Mabogo, 1990). Additional anecdotes were added (Table 1).

Ingesting the roots of *L. rugosa* promotes strong and robust growth in children (Mabogo, 1990). Additional anecdotes were added (Table 1).

Phyla nodiflora, there is no previously known documented scientific literature on the medicinal applications of this plant species. New findings of the plant species' medicinal uses from the study were recorded in Table 1.

The study also discovered several new uses of already-known medicinal plants (Table 1). Finding independent confirmation and recording additional anecdotal evidence of the uses of medicinal plants are most important to advance scientific inquiry into this knowledge area.

Much of the indigenous knowledge on traditional medicinal applications of plants documented over the years has not yet been codified in a set of standard reference works. Recorded findings and observations are spread out over a multitude of sources in the literature. In addition, it is reasonable to assume that a great wealth of indigenous knowledge on this subject still remains undocumented. We have already alluded to perils of a possible irretrievable loss of cultural heritage and practical knowledge to future generations, should the tradition of oral knowledge transmission start to fail at some point in the future. These factors once more highlight the need for researchers to systematically set about recording and classifying this knowledge and to do so by drawing on its most authentic source, namely the relevant communities themselves (Wintola and Afolayan, 2010).

In order to aid the discovery of new drugs and to find the best applications of traditional medicine, it is essential to formally record and thus preserve the traditional knowledge on medicinal plants. A thorough knowledge of Botany is an essential tool for the proper identification and documentation of medicinal plants. This knowledge area is also crucial in order to help protect individuals from making potentially lethal identification mistakes when gathering medicinal plants for treating themselves or others (Koné and Atindehou, 2008).

4. Conclusion

There is a clear need to document traditional knowledge on medicinal plant usage before it becomes lost to future generations. The lack of scientific literature records on the medicinal uses of some plant species, such as *C. decapetala*, *S. obtusifolia*, *P. nodiflora* and *S. asiatica*, shows that further ethnobotanical survey studies are necessary to record and document the traditional uses of medicinal plants in South Africa and worldwide.

This study has identified a number of important medicinal plants used by the traditional healers of the Lwamondo area for the treatment of various human ailments. It provides a baseline for future phytochemical and pharmacological investigations into the beneficial medicinal properties of such plants.

Instead of relying on trial and error occasioned by random screening procedures, properly documented traditional knowledge could help scientists to target those plants whose medicinal properties may find new applications for the benefit of all mankind (Fennell et al., 2004).

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