

A comparative study of medicinal plants used in rural areas of Namibia and Zimbabwe

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Herbal medicines prepared from wild plants play an important role in the primary healthcare needs of people living in developing countries. A comparative ethnobotanical study was undertaken to document medicinal plants used in rural areas of Namibia and Zimbabwe. In order to document medicinal plants used for primary healthcare in rural areas of Namibia and Zimbabwe, 56 traditional healers were identified using the Participatory Rapid Appraisal (PRA) approach. Data was collected through semi-structured interviews, observation and guided field walks with the traditional healers, between January and October 2008. A total of 16 medicinal species belonging to 14 genera and 11 families were recorded in both Namibia and Zimbabwe. Three of these species (18.8%) had similar medicinal applications in the two countries. A total of 25 human health problems were treated by these medicinal species in Namibia, while 21 human and one veterinary health problems were treated with herbal medicines in Zimbabwe. General body pain, cold, cough, fever, flu and sore throat, dermatological and venereal diseases were treated with the highest number of medicinal plants in both countries. This comparative study revealed that traditional knowledge on herbal medicines is well founded.

Keywords: Ethnobotany, Namibia, Primary healthcare, Traditional medicines, Zimbabwe

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Herbal medicines prepared from wild plants play an important role in the primary healthcare needs of people living in developing countries. There is an increasing adoption of the Western pharmaceutical drugs in developing countries, but traditional medicines still represent the main source of primary healthcare. In certain African countries, up to 90% of the population still relies exclusively on wild plants as sources of medicines¹. Although traditional medicines are recognised as important for maintaining the health of 70-80% of people living in rural and urban communities throughout the African continent², relatively little comparative studies have been done on utilisation of medicinal plants by various cultures or ethnic groups in the African continent. The majority of comparative studies on herbal medicines have been

done in the developed countries³⁻⁸. In one of the few comparative studies carried out so far in Africa, Towns & Van Andel⁹ examined how Beninese and Gabonese women utilized medicinal plants for maternal health problems. This study provides baseline data on how women in Benin and Gabon manage women's reproductive health problems using medicinal plants and more importantly, use patterns across national boundaries is provided. Therefore, the objective of this study was to investigate the trends in medicinal plant usage in rural areas of Namibia and Zimbabwe.

Methodology

Study area and data collection

In Namibia, the study was conducted in 10 constituencies (Engodi, Genius, Okankolo, Olukonda, Omuntele, Omuthiya, Onayena, Oniipa,

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Onyaanya and Tsumeb) in the Oshikoto region, and 7 villages (Chikato, Donga, Gamwa, Gundura, Hanke, Tongogara and Zvamatenga) in the Midlands Province, Zimbabwe (Fig. 1). In order to document medicinal plant use patterns in Namibia and Zimbabwe, field surveys were carried out between January and October 2008. Forty seven and 9 traditional healers were interviewed in Namibia and Zimbabwe, respectively. Members of the local community were asked to give the names of the most renowned traditional healers in the study area. Prior informed consent was sought from each participant before interviewing them and we adhered to the ethical standards of the International Society of Ethnobiology¹⁰. Participatory Rural Appraisal (PRA) methods were used¹¹ to systematically collect data on medicinal plant utilization (plant species and part(s) used, use(s) and preparation) and local name(s) of the plant species in question.

Plants mentioned by the participants during the interviews were collected. Plants were initially identified by participants with their vernacular names. Plants collected in Zimbabwe were verified at the National Herbarium and Botanic Garden, Harare (SRGH), while those collected in Namibia were verified using Tree Atlas species of Namibia. All plant scientific names, plant families and plant authorities were verified using internet sources such as the International Plant Name Index (www.ipni.org), the Missouri Botanical Garden's Tropicos Nomenclatural database (www.tropicos.org) and the Royal Botanic Garden and Missouri Botanic Garden plant name database (www.theplantlist.org).

Data management and analysis

The data collected were entered in Microsoft Excel 2007 programme and were later analysed for descriptive statistical patterns. We followed the method proposed by Cook¹² in classifying human ailments treated by herbal medicines. However, in some cases Cook's categories were not precise enough and alternative ailment categories were used. Descriptive statistics, such as percentages and frequencies were used to analyse the data obtained from the questionnaires. Bar graphs were generated using Microsoft Excel 2007 programme.



Fig. 1—Map of southern Africa illustrating geographical position of the study sites

Results

Medicinal plants diversity

A total of 16 plant species **belonging to 14 genera and 11 families** were used by residents of both the Oshikoto region in Namibia and the Midlands Province in Zimbabwe (Table 1). Almost all of the reported species are indigenous to the 2 countries, with the exception of *Ricinus communis* L., a well known cosmopolitan weed. Plant families with the highest number of medicinal plants were Ebenaceae, represented by three species, followed by Fabaceae *sensu lato* and Olacaceae and Rhamnaceae represented by two species each. The rest of the families were represented by one species each, as shown in Table 1. The genera with highest number of species were *Diospyros* and *Ximenia* represented by two species each.

Growth habit and parts used

Trees (56.3%) and shrubs (37.5%) were the primary sources of herbal medicines (Table 1). The plant parts used for making herbal preparations were the bark, fruits, kernel oil, leaves, roots, sap and seeds. The roots were the most frequently used (100% in both countries), followed by bark and leaves (62.5% each), fruits (18.8%), kernel oil (6.3%), seeds (12.5%) and sap (6.3%) (Fig. 2).

Ailments and diseases treated and herbal preparation

The majority of the medicinal species (56.3%) were used in the treatment of 2-4 ailments in both

Table 1—List of medicinal plants reported as useful in traditionally managing human and livestock diseases in Namibia and Zimbabwe. Species marked with asterisk (*) is exotic to both Namibia and Zimbabwe (*contd.*)

Species and Family name	Growth habit	Namibia			Zimbabwe		
		Voucher number	Vernacular name (Oshiwambo)	Part(s) used and use(s)	Voucher number	Vernacular name (Shona)	Part(s) used and use(s)
<i>Berchemia discolor</i> (Klotzsch) Hemsl.; Rhamnaceae	Tree	IKSTF0001	<i>Omuye</i>	Bark, leaves: flu and cold, nose bleeding, skin itching	AM523	<i>Nyii</i>	Roots: abdominal pain
<i>Diospyros lycioides</i> Desf.; Ebenaceae	Shrub	IKSTF0031	<i>Oshimumu</i>	Bark, leaves, roots: bleeding, fever, toothache	AM503	<i>Musumhadomb o</i>	Roots: infertility in women
<i>Diospyros mespiliformis</i> Hochst. ex A.DC.; Ebenaceae	Tree	IKSTF0007	<i>Omwandi</i>	Roots: male dysfunction	AM333	<i>Musuma</i>	Roots: abdominal pain
<i>Euclea divinorum</i> Hiern; Ebenaceae	Shrub	IKSTF0536	<i>Omudime</i>	Bark, seeds: bleeding	AM401	<i>Mushangura</i>	Roots: diarrhoea
<i>Ficus sycomorus</i> L.; Moraceae	Tree	IKSTF0044	<i>Omukwiyu</i>	Bark, leaves: constipation, dermatitis	AM301	<i>Muonde</i>	Roots: cough
<i>Grewia flavescens</i> Juss.; Tiliaceae	Shrub	IKSTF0011	<i>Omush e</i>	Leaves, roots: cough, diarrhoea	AM512	<i>Mubhubhunu</i>	Roots: menorrhagia
<i>Peltophorum africanum</i> Sond.; Fabaceae <i>sensu lato</i>	Tree	IKSTF0320	<i>Omupalala</i>	Fruits, roots: leg pain	AM309	<i>Muzeze</i>	Bark, leaves, roots: diarrhoea, sore eyes, STI, syphilis, toothache
<i>Pterocarpus angolensis</i> DC, Fabaceae <i>sensu lato</i>	Tree	IKSTF0513	<i>Omuhuva</i>	Bark, fruits, roots: bleeding, coughing, leg pain	AM284	<i>Mubvamaropa</i>	Bark, roots, sap: earache, infertility in women, menorrhagia, sore eyes, veterinary medicine
* <i>Ricinus communis</i> L.; Euphorbiaceae	Herb	IKSTF0577	<i>Olumono</i>	Roots, seeds: epilepsy	AM290	<i>Mupfuta</i>	Roots, seeds: sore eyes, toothache
<i>Sclerocarya birrea</i> (A. Rich.) Hochst.; Anacardiaceae	Tree	IKSTF0023	<i>Omugongo</i>	Bark, kernel oil, leaves, roots: cough, ear infection, epilepsy, heartburns, tonsillitis, toothache	AM403	<i>Mupfura</i>	Roots: earache, sore eyes
<i>Securidaca longepedunculata</i> Fresen.; Polygalaceae	Shrub	IKSTF0565	<i>Omudhiku</i>	Roots: stroke	AM285	<i>Mufufu</i>	Roots: epilepsy, snake repellent
<i>Strychnos cocculoides</i> Bak.; Loganiaceae	Tree	IKSTF0321	<i>Omaguni</i>	Roots: culture bound syndrome	AM478	<i>Muzumwi</i>	Roots: abdominal pains, aphrodisiac, gonorrhoea, infertility in men, sore throat

(contd.)

Table 1—List of medicinal plants reported as useful in traditionally managing human and livestock diseases in Namibia and Zimbabwe. Species marked with asterisk (*) is exotic to both Namibia and Zimbabwe

Species and Family name	Growth habit	Namibia			Zimbabwe		
		Voucher number	Vernacular name (Oshiwambo)	Part(s) used and use(s)	Voucher number	Vernacular name (Shona)	Part(s) used and use(s)
<i>Vangueria infausta</i> Burch.; Rubiaceae	Tree	IKSTF0575	<i>Oshimbu</i>	Leaves: dermatitis	AM400	<i>Mudvirumombe</i>	Roots: diarrhoea
<i>Ximenia americana</i> L.; Olacaceae	Shrub	IKSTF0015	<i>Kakukulu</i>	Bark, leaves, roots: constipation, culture bound syndrome, gonorrhoea, scoliosis	AM439	<i>Munhengeni</i>	Leaves: backache
<i>Ximenia caffra</i> Sond.; Olacaceae	Shrub	IKSTF0005	<i>Ompeke</i>	Bark, roots: culture bound syndrome, fertility/impotent, gonorrhoea, scoliosis, stomachache, unstable pregnancy	AM535	<i>Mutengeni</i>	Leaves, roots: aphrodisiac, backache, diarrhoea, venereal diseases, wounds
<i>Ziziphus mucronata</i> Willd.; Rhamnaceae	Tree	IKSTF0002	<i>Omukekete</i>	Bark, leaves, roots: gonorrhoea, skin allergy and rash, sore fingers	AM319	<i>Muchecheni</i>	Fruits, leaves, roots: abdominal pains, boil, infertility in women, wounds

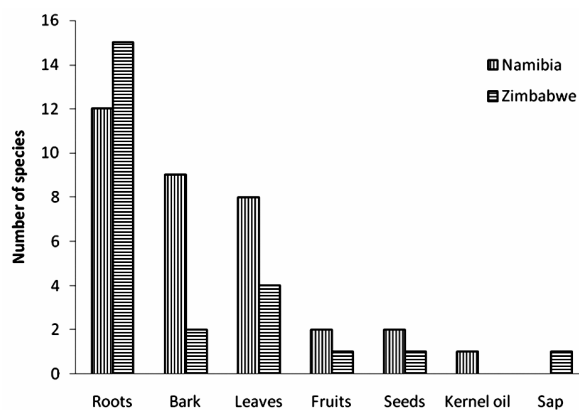


Fig. 2—Plant parts used as herbal medicines in Namibia and Zimbabwe

countries (Table 1). The following 7 plant species (43.8%) were used in the treatment of at least 5 ailments: *Ximenia americana* L. (5 ailments in total), *Peltophorum africanum* Sond. and *Strychnos cocculoides* Bak. (6 ailments each), *Sclerocarya birrea* (A. Rich.) Hochst. and *Ziziphus mucronata* Willd. (7 ailments each), *Pterocarpus angolensis* DC. (8 ailments) and *Ximenia caffra* Sond. (11 ailments). A comparison of medicinal applications showed that

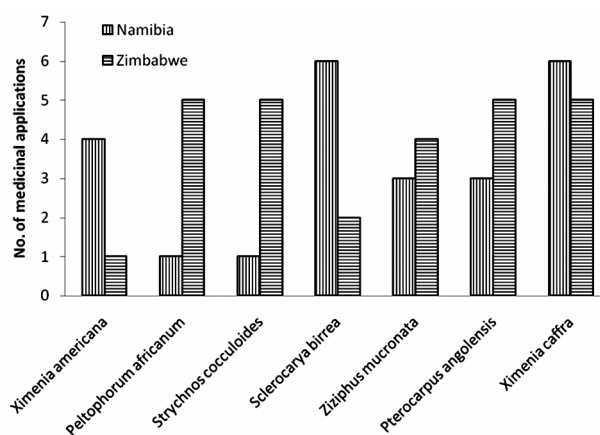


Fig. 3—A comparison of medicinal applications of the main herbal medicines in Namibia and Zimbabwe

the majority of these species (81.3%) were used for different purposes in the two countries (Table 1, Fig. 3). Only three of the documented species (18.8%) had similar herbal applications in the two countries (Table 1). *Sclerocarya birrea* was used to treat ear infection in Namibia and earache in Zimbabwe (Table 1). *Ximenia caffra* was used as a remedy for fertility or impotence and gonorrhoea in Namibia and

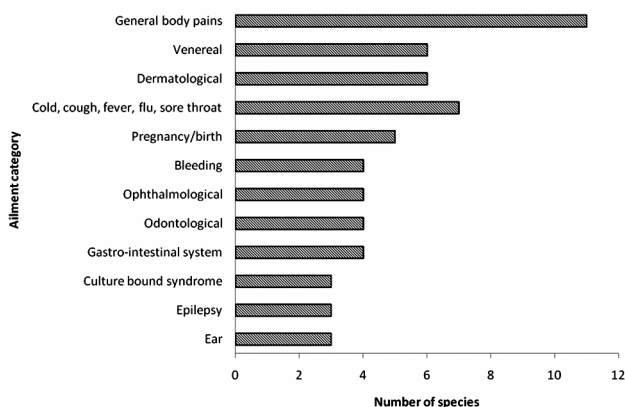


Fig. 4—Major ailments and disease categories and medicinal plant species reported

as an aphrodisiac and venereal diseases in Zimbabwe (Table 1). *Ziziphus mucronata* was used as herbal medicine against skin allergies and rashes in Namibia and remedy for boils in Zimbabwe (Table 1). A total of 25 human health problems were treated by herbal medicines in Namibia, while 21 human and one veterinary health problems were treated with herbal medicines in Zimbabwe (Table 1). General body pain, cold, cough, fever, flu and sore throat, dermatological and venereal diseases were treated with the highest number of medicinal plant species in both countries (Fig. 4).

Discussion

The results from this study showed similarity in herbal medicine applications in Namibia and Zimbabwe, regardless of cultural differences in study areas of language, religion and social organization. The following species documented in this study: *Berchemia discolor*, *Diospyros lycioides*, *Diospyros mespiliformis*, *Euclea divinorum*, *Peltophorum africanum*, *Pterocarpus angolensis*, *Ximenia americana*, *Ximenia caffra* and *Ziziphus mucronata* have also been reported as important herbal medicines in other previous studies in Namibia¹³⁻¹⁶. Previous studies in Zimbabwe^{17,18} recorded *Euclea divinorum*, *Ricinus communis*, *Sclerocarya birrea*, *Securidaca longepedunculata* and *Ximenia caffra* among the most prescribed herbal medicines. Of the assessed medicinal plants, nine species (56.3%) are members of Ebenaceae,

Fabaceae *sensu lato*, Olacaceae and Rhamnaceae families. Apart from being a reflection of the worldwide high number of species found in these families, this is also a reflection of the medicinal properties in the families¹⁸.

Medicinal plants documented in this study are used to treat a number of diseases, ranging from general body pain to complicated conditions like epilepsy and sexual dysfunction (Table 1). General body pain, cold, cough, fever, flu and sore throat, dermatological and venereal diseases were treated with the highest number of species (Fig. 4). Venereal diseases and sexually transmitted infections in general are a major public health concern in Namibia^{14,15,19} and in Zimbabwe^{17,18,20}. Transmission rate of sexually transmitted infections in southern Africa is currently one of the highest in the world²¹. According to Kambizi and Afolayan²⁰, sexually transmitted diseases (STDs), among them gonorrhoea, genital herpes, syphilis and hepatitis are common in local communities. Sexually transmitted infections are one of the most common reasons for people to use herbal medicines and visit traditional healers in Namibia¹⁴, Zimbabwe¹⁷ and South Africa²¹. Ethnobotanical surveys have been found to be one of the reliable approaches to drug discovery²², and several active compounds have been discovered from plants on the basis of ethnomedicinal information and used directly as patented drugs. Therefore, medicinal plants used in communities are not only important as an integral part of the traditional medical system of local people, but could also play an important role as sources of pharmaceutical drugs in the future.

Conclusion

This study showed high similarities in traditional uses of medicinal plants among the studied areas in Namibia and Zimbabwe which could be used as confirmatory indicator for the effectiveness of the reported medicinal plants in treating many human ailments and diseases. Some of the plants discussed in this study have been used for centuries as traditional medicines and the knowledge accumulated in their utilization over generations will assist in identification and isolation of active principles in

medicinal preparations. Efforts should be made to start in-depth analytical studies to identify and validate the ethnomedicinal and pharmacological compounds of interest which may lead to new treatment and improve the primary healthcare of local communities. Further study may contribute to development of important pharmaceutical products for future use.

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References

- Hostettmann K, Marston A, Ndjoko K & Wolfender JL, The potential of African medicinal plants as a source of drugs, *Curr Org Chem*, 4 (2000) 973-1010.
- Cunningham AB, *African Medicinal Plants: Setting Priorities at the Interface Between Conservation and Primary Healthcare*, (People and Plants Working Paper No. 1; UNESCO, Paris), 1993.
- Moerman DE, Pemberton RW, Kiefer D & Berlin B, A comparative analysis of five medicinal floras, *J Ethnobiol*, 19 (1999) 49-67.
- Leporatti ML & Ivancheva S, Preliminary comparative analysis of medicinal plants used in the traditional medicine of Bulgaria and Italy, *J Ethnopharmacol*, 87 (2003) 123-142.
- Vandebroek I, Van Damme P, Van Puyvelde L, Arrazola S & De Kimpe N, A comparison of traditional healers' medicinal plant knowledge in the Bolivian Andes and Amazon, *Soc Sci Med*, 59 (2004) 837-849.
- Pieroni A & Quave CL, Traditional pharmacopoeias and medicines among Albanians and Italians in southern Italy: A comparison, *J Ethnopharmacol*, 101 (2005) 258-270.
- Collins S, Martins X, Mitchell A, Teshome A & Arnason JT, Quantitative ethnobotany of two East Timorese cultures, *Econ Bot*, 60 (2006) 347-361.
- Leporatti ML & Ghedira K, Comparative analysis of medicinal plants used in traditional medicine in Italy and Tunisia, *J Ethnobiol Ethnomed*, 5 (2009) 31.
- Towns AM & van Andel T, Comparing local perspectives on women's health with statistics on maternal mortality: An ethnobotanical study in Bénin and Gabon, *BMC Comple Altern Med*, (14) 2014 113.
- International Society of Ethnobiology, *ISE Code of Ethics*. URL: <http://ethnobiology.net/code-of-ethics/> [accessed on 15 September 2014].
- Chambers R, The origins and practice of participatory rural appraisal (PRA), *World Dev*, 22 (1994) 953-969.
- Cook FEM, *Economic Botany Data Collection Standard*, (Royal Botanic Gardens; Kew, Richmond), 1995.
- Dan V, Mchombu K & Mosimane A, Indigenous medicinal knowledge of the San people: The case of farm six, northern Namibia, *Information Dev*, 26 (2010) 129-140.
- Cheikhoussef A, Shapi M, Matengu K & Mu Ashekele H, Ethnobotanical study of indigenous knowledge on medicinal plant use in Oshikoto region, Namibia, *J Ethnobiol Ethnomed*, 7 (2011) 10.
- Cheikhoussef A, Mapaure I & Shapi M, The use of some indigenous plants for medicinal and other purposes by local communities in Namibia with emphasis on Oshikoto region: A review, *Res J Med Plant*, 5 (2011) 406-419.
- Cheikhoussef A & Embashu W, Ethnobotanical knowledge on indigenous fruits in Ohangwena and Oshikoto regions in northern Namibia, *J Ethnobiol Ethnomed*, 9 (2013) 34.
- Maroyi A, Ethnobotanical study of medicinal plants used by people in Nhema communal area, Zimbabwe, *J Ethnopharmacol*, 136 (2011) 347-354.
- Maroyi A, Traditional use of medicinal plants in south-central Zimbabwe: Review and perspectives, *J Ethnobiol Ethnomed*, 9 (2013) 31.
- Chinsemu KC, Hedimbi M & Mukaru WC, Putative medicinal properties of plants from the Kavango region, Namibia, *J Med Pl Res*, 5 (2011) 6787-6797.
- Kambizi L & Afolayan AJ, An ethnobotanical study of plants used for the treatment of sexually transmitted diseases (njoyhera) in Guruve district, Zimbabwe, *J Ethnopharmacol*, 77 (2001) 5-9.
- Van Vuuren SF & Naidoo D, An antimicrobial investigation of plants used traditionally in southern Africa to treat sexually transmitted infections, *J Ethnopharmacol*, 130 (2010) 552-558.
- Rates SMK, Plants as a source of drugs, *Toxicon*, 39 (2001) 603-613.