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Full Length Research Paper

An ethnobotanical study of plants used for the treatment of ear, nose and throat (ENT) infections in Nkonkobe Municipality, South Africa

Lwandiso Dyubeni and Lisa V. Buwa*

Department of Botany, School of Biological and Environmental Sciences, University of Fort Hare Private Bag X1314, Alice, Eastern Cape, 5700, South Africa.

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The use of medicinal plants in the treatment of infectious diseases has been used by the majority of the world's population for thousands of years. South Africa has a rich heritage of indigenous knowledge on the use of traditional medicinal plants. The Eastern Cape Province of South Africa is particularly known for its richness in plant species. The indigenous people of this province have a long history of traditional plant usage for the treatment of various diseases and ailments. An ethnobotanical survey of medicinal plants used for the treatment of ear, nose and throat (ENT) infections in Nkonkobe Municipality of the Eastern Cape Province, South Africa, was conducted through the use of structured questionnaires. Respondents included traditional healers and herbalists. The information collected revealed 27 plant species belonging to 21 families were used to treat ENT infections. Members of the Asteraceae family were reported to be the most prominent followed by Lamiaceae, Alliaceae and Rutaceae, respectively. The leaves were reported to be the most used part of the plants, constituting about 59% of the herbal preparations, followed by the bark and roots (11% each), bulb, rhizome and stem (5% each), and twigs and fruits (2% each). Methods of herbal administration involved drinking the extracts, snuffing the powdered leaves and squeezing the warm leaf sap directly into the ear, for healing the throat, nose and ear infections respectively. Plants reported in this survey are important candidates for phytochemical and pharmacological tests.

Key words: Ear, nose and throat infections, herbal medicine, traditional healers.

INTRODUCTION

The use of medicinal plants in the treatment of infectious diseases is an age-old practice and several natural products are used as phytotherapic for treatment of many diseases. Traditional medical practices in Africa date as far back as 4000 years (Abu-Rabia, 2005). They were the only medical system in Africa for healthcare before the advent of modern or orthodox medicine. Today, traditional medicine is still the predominant means of health care in developing countries where about 80% of their total population depends on it for their well being (Ernst, 2005). Knowledge of medicinal plants is, however, rapidly dwindling due to the influence of western lifestyles, reduction in number of traditional healers and lack of interest of the younger generations to carry on the tradition (Bussmann et al., 2006).

South Africa has a rich heritage of indigenous knowledge on the use of traditional medicinal plants (Hutchings and van Staden, 1994; Van Wyk et al., 1997). Traditional medicine is widely practiced and medicinal plants are traded and used all over Southern Africa. An estimated three million people in South Africa are currently using indigenous, traditional plant medicine for primary healthcare purposes (Van Wyk and Gericke, 2002). The Eastern Cape Province of South Africa is particularly known for its richness in plant species. The indigenous people of this province have a long history of traditional plant usage for the treatment of various

*Corresponding author. E-mail: LBuwa@ufh.ac.za. Tel: +2740-6022320. Fax: +2740-6022323.

diseases and ailments (Grierson and Afolayan, 1999).

Human infections constitute a serious problem and most frequent pathogens are microorganisms such as bacteria and fungi. The ear, nose and throat (ENT) are vital organs in the body that are all closely connected, a problem in one area can trigger off problems in the other two areas. ENT infections are caused by the exposure of the ear, nose and throat to bacterial, fungal, viral and environmental factors. ENT infections affect the functioning of adults as well as children, often with significant impairment of the daily life of affected patients (Witsell et al., 2001). Although, antibiotics have contributed to the control of ENT infections, their over-use and misuse is now seen to cause an increase in antibiotic resistance (Bhattacharyya and Shapiro, 2002). With the increasing resistance of microorganisms associated with ENT infections and increasing environmental pollution, alternative sources for new drugs are necessary.

The continuous search for natural products for use as medicines is encouraged by ethnobotanical studies; Igoli et al. (2005) recognized ethnobotanical survey as one of the major approaches for selecting plants for pharmacological screening. Several workers have conducted ethnobotanical surveys in the Eastern Cape and resulted in the list of many plants that are used for the treatment of various diseases (Grierson and Afolayan, 1999; Kambizi and Afolayan, 2001; Masika and Afolayan, 2003; Erasto et al., 2005; Koduru et al., 2007; Wintola and Afolayan, 2010; Afolayan and Mbaebie, 2010). In continuation of studies of ethnobotany in the province for documentation of useful plants and drug discovery efforts (Bhat and Jacobs, 1995; Pendota et al., 2008; Oyedemi et al., 2009), the ethnobotanical survey of plants used in the treatment of ENT infections in Nkonkobe Municipality of the Eastern Cape Province as well as the parts of the plants used and the various methods of preparation and administration was done, with the aim of documenting the information for future reference.

MATERIALS AND METHODS

The study area

The study was undertaken from April to September 2010, among traditional healers and herbalists in Nkonkobe Municipality (32° 47' S and 26° 50' E) of the Eastern Cape Province, South Africa. The area is bounded by the sea in the east and drier Karroo in the west (Erasto et al., 2005). The altitude is approximately 1300 m above sea level and the vegetation is veld type 7 (Masika and Afolayan, 2003).

Sampling and interview of healers

Adopting the methods of Jovel et al. (1996), information was compiled through general conversations with the informants while structured questionnaires were used to obtain additional information about the methods of treatment. A total of thirty-six informants, comprising 18 each of traditional healers and herbalists were interviewed from the respective study area. Twenty-one of the informants were females and were between the ages of 37 and 45 years old while the remaining fifteen were males whose age ranged between 28 and 65 years old. All the informants were born in the Nkonkobe Municipality with the exception of one female herbalist but had lived in the area for most of her life. The information that was collected included local names, the parts of the plant used, method of preparation, method of administration, usage and personal experience, gender, age group and level of education of the plant users.

Identification of plants

Plants were initially identified by their common names by the traditional healers and herbalists. Voucher specimen for each of the reported plants were collected, dried and brought back to the University of Fort Hare for identification and follow-up literature search. The collected plants were identified by Prof. Donald S. Grierson and the voucher specimens (Dyubeni 01 to 27) have been deposited in the Giffen Herbarium of the University of Fort Hare.

Intellectual property agreement statement

All the traditional healers and herbalists who contributed information to this project during the ethnobotanical survey were adequately financially rewarded with further verbal agreement that this research shall not be for commercial purposes, but to serve as enlightenment to the community and the entire Eastern Cape Province on the plants used for the treatment of ENT infections in the area.

RESULTS AND DISCUSSION

During the ethnobotanical survey, it was established that all the people questioned regularly used medicinal plants to treat ENT infections and other infectious diseases. The study revealed that twenty seven species belonging to 21 plant families were used in the treatment of ENT infections by the traditional healers and herbalists (Table 1). The results from the study also showed that members of the family Asteraceae (three species) were the most commonly used plants for the treatment of ENT infections. Other families included, Lamiaceae (two species), Alliaceae (two species) Rutaceae (two species) while the remaining families all had one species. Six plants were frequently mentioned for the treatment of ENT infections by the traditional healers and herbalists. These included *Artemisia afra, Lippia javanica, Allium sativum* for the throat infections, *Sansevieria Hyacithoides* and *Cotyledon orbiculata* for the ear infections and *Asclepias fruticosa* L. for the nose infections. The leaves were reported to be the most used part of the plants, constituting 59% of the herbal preparations. This was followed by the bark and roots (11% each), bulb, rhizome and stem (5% each), and twigs and fruits (2% each).

Boiling the plant material was the most commonly used method of preparation for the plants used against throat

Table 1. Plants used for the treatment of ENT infections in Nkonkobe Municipality of the Eastern Cape Province, South Africa.

Plant family name	Scientific name	Vernacular name (Xhosa)	Disease	Plant part used	Method of preparation	Method of administration
Alliaceae	*Allium sativum* L.	Ivimbampunzi	TI	Leaves and bulb	A decoction of leaf and bulb is made. Cloves of the bulb are also used.	A decoction of leaf and bulb is taken orally and cloves of the bulb may be chewed to treat throat infections.
			EI	Leaves	Leaves are warmed.	The juice is squeezed onto the ear to relieve earache.
	Tulbaghia violacea	Itswele lomlambo	TI	Bulb	Fresh bulbs are boiled.	The decoctions are taken orally to treat throat infections.
Asteraceae	*Artemisia afra* L. Jacq. Ex Wild.	Umhlonyane	TI	Leaves, stem and roots	Leaves, stems and roots are boiled.	Taken orally and steam from the boiling leaves is inhaled.
			EI	Leaves	Leaves are boiled.	The warm brew is dropped into the ear to relieve earache.
			NI	Leaves	Fresh leaves are used raw.	Fresh leaves are inserted into the nostrils to help blocked nose and infection.
	Aster bakeranus L.	Unozixekana	NI	Roots	Dried, powdered roots are used.	Dried, powdered roots are snuffed to relieve nose infection.
	Helichrysum gymnocomum Mill.	Impepho	TI	Leaves	Leaves are boiled in water.	Leaves are boiled in water and taken orally.
			NI	Leaves	Dried, powdered leaves are used.	Dried, powdered leaves are used as a snuff.
	Tarchonanthus camphorates L.	Umathola	TI	Leaves and twigs	Infusions and tinctures of the leaves and twigs are used.	Taken orally to treat throat infections.
Apocynaceae	*Vinca minor* L.	Iflawa	NI	Leaves and stems	Leaves and stems are powdered.	The powder is snuffed to treat nose infections.

Table 1. Contd.

Araceae	*Zantedeschia aethiopica* L.	Inyibiba	TI	Rhizomes	Rhizomes are dried and ground to fine powder and mixed with water.	The drug is administered by gargling to treat throat infections.
Asclepiadaceae	*Asclepias fruticosa* L.	Igwada	NI	Leaves	Leaves are dried and powdered.	Powdered leaves are snuffed.
Crassulaceae	*Cotyledon orbiculata*	Imphewula	EI	Leaves	Leaves are heated.	The warm leaf juice is dropped inside the ear.
Euphorbiaceae	*Clutia pulchella* L.	Umbheso	NI	Bark	Bark is ground into powder.	The powder is snuffed.
Fabaceae	*Erythrina caffra* Thunb.	Umsintsi	EI	Leaves	Infusions of the leaves are used.	Infusions of the leaves are used as ear drops to relieve earache.
Geraniaceae	*Pelargonium sidoides*	Umsongelo	TI	Roots	Roots are boiled.	Taken orally.
Labiatae	*Leonotis leonurus*	Umficamficane	TI	Leaves and roots	Decoctions are used.	Taken orally to treat throat infections.
Lamiaceae	*Salvia microphylla* Kunth	Isikhikhi	TI	Leaves	Leaves are boiled; also they can be chewed raw.	Sage tea is taken orally to cure sore throat and leaves are also chewed to relieve throat infections.
	Mentha longifolia (L.)	Inxina	TI	Leaves	Leaves are boiled.	Tea made from leaves is taken orally.
			NI	Leaves	Dried, powdered leaves are used.	Dried, powdered leaves are used as a snuff.
Melianthaceae	*Bersama tysoiana*	Isibhara	TI	Bark	Bark is boiled with water or chewed raw to treat throat infections.	Bark is chewed to treat throat infections. Tea made from boiling bark is taken orally.
Mesembryanthemaceae	*Carpobrotus edulis* (L.)	Igcukuma	TI	Leaves	Fresh leaf juice is used.	Fresh leaf juice is taken orally or gargled to treat infections of the throat.
			EI	Leaves	Leaves are warmed.	The juice squeezed onto the ear to relieve earache.

Table 1. Contd.

Oleaceae	*Olea europaea* L.	Umnquma	TI	Leaves and bark	Leaves are boiled	Tea from boiled leaves is gargled to treat sore throat.
Rhamnaceae	*Ziziphus mucronata* L.	Umphafa	TI	Leaf, bark and roots	Warm infusions of roots, bark or leaves are used.	Taken orally to treat sore throat.
Ruscaceae	*Sansevieria hycinthoides* Thunb.	Skholokotho	EI	Leaves	A cut leaf is heated.	The warm leaf juice squeezed into the ear.
Rutaceae	*Zanthoxylum capense* L.	Umlungumabele	TI	Fruits and leaves	Infusions or decoctions of the fruits or leaves are used. Root or bark decoctions are also used.	Decoctions are used for gargling to treat throat infections.
	Ruta graveolens L.	Iyeza lomoya	EI	Leaves	Rolled up, bruised leaves are used.	Rolled up, bruised leaves are packed into the ear to relieve earache.
Ulmaceae	*Celtis Africana* Burm.f.	Umnonono	TI	Bark	Bark may be boiled in water or chewed raw.	Tea made from the bark is taken orally and the bark may be chewed to relieve sore throat.
Urticaceae	*Urtica dioica* L.	Uralijane	NI	Leaves	Dried, powdered leaves are used.	Dried, powdered leaves are used as a snuff.
Verbenaceae	*Lippia javanica* L.	Inzinziniba	TI	Leaves	Hot leaf infusions are made.	Tea made from the leaves is taken orally.
			NI	Leaves	Dried, powdered leaves are used.	Dried, powdered leaves are used as a snuff.
Zingiberaceae	*Zingeber officinale*	Ijinja	TI	Rhizomes	Fresh or dried rhizomes are used.	Fresh or dried rhizomes are chewed to relieve throat infections.

Vernacular names (Xhosa) in brackets: TI, throat infection (Umqala obuhlungu, Izilonda emqaleni); NI, nose infections (Izilonda empumlweni, Umongoza; EI, ear infections (Indlebe ebuhlungu, Izilonda endlebeni).

infections. Grounding plant material into fine powder was the preparatory method that was often used for plants used in the treatment of nose infections, while, warming the leaf was frequently used in the treatment of ear infections. Application of the herbal remedies varied from drinking the boiled plant material for throat infections, snuffing the powdered leaves for the nose infections and squeezing the warm leaf sap directly into the ear for ear infections.

Information from the literature revealed that these plants are used for the treatment of many

other human diseases in the Eastern Cape Province. For example, *A*. *fruticosa*, has been used in the treatment of infertility (Veale et al., 1992). *A. afra* is reported to be effective in the treatment of coughs, colds, bronchitis and tuberculosis (Buwa and Afolayan, 2009). It is also used to treat fevers, mumps swelling, pneumonia, pimples and skin rashes (Van Wyk and Gericke, 2002). *S. hyacinthoides* is used against hemorrhoids, ulcers, intestinal worms and diarrhea (Hutchings et al., 1996; Van Wyk et al., 1997). The plant is also used in the ethnoveterinary medicine for the treatment of conjunctivitis in sheep and goats and as a wash to treat swollen limbs (Dold and Cocks, 2001).

This study has unveiled the vital role that medicinal plants play in the primary healthcare of the people of the Eastern Cape Province. Based on the observations, it is expected that the results of this study will lead to phytochemical and pharmacological investigations with the plants showing reasonable antimicrobial activity.

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