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An ethnobotanical study of plants used for the treatment of sexually transmitted diseases (*njovhera*) in Guruve District, Zimbabwe

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1. Introduction

In many parts of Africa, herbal medicine still plays a vital role in health care delivery system especially in remote places where clinics and hospitals are sparsely located. In these communities, traditional herbalists operate closer to the people, taking advantage of the bio-diversity of plant species in such areas to cure various diseases and ailments (Ndubani and Gelfand). Although herbal medicine is well established in many cultures and traditions of Africans, and is still a way of life of almost 80% of the people in Africa (Cotton and Jager), unfortunately however, not much information has been documented in scientific literature. Information on herbal medicine in this part of the world has been dominated by oral tradition (Van Wyk et al., 1997).

In Guruve, a southern district of Zimbabwe, sexually transmitted diseases (STDs) (*njovhera)* are common within the community, just like any other parts of under-developed world. Before the advent of HIV AIDS, STDs were generally referred to as *njovhera* by the people of the district. These include gonorrhoea, genital herpes, syphilis and hepatitis. Plant materials prescribed by traditional healers and herbalists, have been used for the treatment of these infections for centuries (Langenhen and Amabeoku). Despite the undoubted success of herbal treatment of *njovhera* in the district, the knowledge and experience of the traditional health practitioners have not been documented in the literature. Considering the current rate of deforestation with the concurrent loss of biodiversity, there is an urgent need for accurate documentation of the knowledge and experience of the traditional herbalists. It is necessary to make an effort to avoid erosion of this knowledge in Guruve District by conserving the information on their useful plants.

In this paper, we report on information gathered from traditional healers, herbalists and rural dwellers on plants used for the treatment of STDs in Guruve, Zimbabwe. We also report on the antibacterial activity of *Acacia nilotica* (L.) Willd. ex Delile, *Cassia abbreviata* Oliv. *Dichrostachys cinerea* Wight and Arn, *Solanum incanum* L., *Vernonia amygdalina* Del. and *Zanha africana* (Radlk) Excell. which, based on the information gathered, are the six commonest species used for the treatment of these infections in the area. According to Boyd (1988), gonorrhea is a bacterial STD which is believed to be widespread in many societies of Africa. It was therefore plausible for us to begin the study of these plants through antibacterial screening.

1.1. The study area

Guruve District of Zimbabwe falls within the latitudes 15°15′–18°30′ S and longitudes 25°15′–30°45′ E. It is a rural settlement, about 150 km north of Harare. The area is characterized by savanna grassland and savanna woodland types of vegetation with dry deciduous thickets in some parts.

2. Methodology

2.1. Ethnomedical information

Information was collected from traditional healers, herbalists and rural dwellers of the following villages: Nyamucherera, Chibondo, Gomba, Chimanga, Rwodzi, Mazarura and Zimunha; all located within the district of Guruve. Through general interviews and questionnaires, information was collected on the names of plants used for the treatment of *njovhera*, the parts of plants used, methods of preparation of plant materials, personal experience of users as well as their beliefs in the herbal treatment of STDs. Clinics and hospitals were visited and health personnel provided information regarding their knowledge of the local plants in the area.

2.2. Collection of plant materials

Plant materials were collected from their natural populations during organized tours through the forest while accompanied by herbalists or any knowledgeable rural dwellers. Only the six plant species which were consistently identified as being used to treat *njovhera* in several villages were collected. The plants were

initially identified by their local names and their proper identification was done using the herbarium of the University of Fort Hare. Voucher specimens (Kambizi Med. 2000/1, Kambizi Med. 2000/2, Kambizi Med. 2000/3, Kambizi Med. 2000/4, Kambizi Med. 2000/5 and Kambizi Med. 2000/6) were prepared and deposited at the Giffen Herbarium, University of Fort Hare.

2.3. Extraction of the plant materials

Air dried plant materials (40 *g*) were extracted separately by shaking for 30 min in 100 ml of water, acetone and methanol. The extracts were filtered through Whatman No.1 filter paper, evaporated to dryness under reduced pressure and later redissolved in their respective solvents to the required concentrations (Taylor and Grierson).

2.4. Preparation of agar-extract plates

Nutrient agar (Oxoid) was prepared by autoclaving and allowed to cool to about 60°C before the addition of the extracts. The agar medium containing the extracts at final concentrations of 0.1, 0.5, 1.0, 5.0 mg/ml was poured into Petri dishes, swirled carefully until the agar began to set and left overnight for the solvents to evaporate (Afolayan and Grierson). Agar plates containing 0.5 ml of either acetone, methanol or water were used as controls respectively.

2.5. Bacteria assay

Bacteria species were obtained from the Department of Biochemistry and Microbiology, University of Fort Hare, making sure that five were Gram-negative and five Gram-positive. Each organism was maintained on nutrient agar plate and was recovered for testing by growth in nutrient broth (Oxoid) for 24 h. Before testing, each culture was diluted 1:100 with fresh sterile nutrient broth. The organisms were streaked in radial patterns on the agar plates (Afolayan and Meyer, 1997) and incubated at 37°C for 24–48 h. Complete suppression of growth was required for an extract to be declared active.

3. Results and discussion

3.1. Ethnomedical information

A total of 42 persons from seven villages within Guruve District were interviewed, out of which 14 were well known traditional healers. This study revealed 15 plant species belonging to 10 families that are commonly found and frequently used for the treatment of STDs in the District (Table 1). Out of the 15 plants, six were repeatedly and independently mentioned by 35 interviewees including each of the 14 traditional healers. Based on this, the six plants: *Acacia nilotica, Cassia abbreviata, Dichrostachys cinerea, Solanum incanum, Vernonia amygdalina* and *Zanha africana* were collected for antibacterial screening. The most commonly represented family is Fabaceace, comprising about 33%. The method of preparation which varies from one herbalist to the other, could be generally classified into three categories namely; infusions made from fresh or dried material (12 species), direct squeezing of plant leaves to extract the juices (three species) and grinding into powdery forms (two species). However, some plants were used in more than one method of preparation. The most frequently used parts of the plants for the treatment of *njovhera* were reported to be roots, constituting about 53% of the preparations. Fruits and leaves constitute 17.5% each while stem bark constitutes 12%. About 80% of the prescriptions to patients of STDs involve oral administration of the medicine.

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00180	Acacia nilotica (L.) Willd. ex Del.	Mimosaceae	mubayamhondoro	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO. - - - H(100) sexually transmitted diseases (*njovhera*), ground fruit into powder and applied on penile sores
05490	Erythrina abyssinica Lam.	Fabaceae	mutiti	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
02680	Cassia abbreviata	Caesalpiniaceae	muvheneka	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of barks, VO.
02680	Cassia singueana Del.	Caesalpiniaceae	munzungu	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
12800	Vernonia amygdalina Del.	Asteraceae	musikavakadzi	H(100) sexually transmitted diseases (*njovhera*), chopped roods, infusion, VO
08910	Musa sp.	Musaceae	mubhanana	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
13150	Ximenia caffra Sond.	Olacaceae	mutsvanzva	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
07860	Lannea edulis (Sond.) Engl.	Anacardiaceae	mutsambatsi	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
	Lannea discolor	Anacardiaceae	mutsamba	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
11650	Solanum incanum L.	Solanaceae	munhundurwa	H(100) sexually transmitted diseases (*njovhera*), cut the fruit and juice or sap applied on affected parts
04740	Dichrostachys cinerea (L.) Wight & Arn.		mupangara	H(100) sexually transmitted diseases (*njovhera*), ground fruit into powder and applied on penile sores
	Zanha africana	Sapindaceae	muchenya	H(100) sexually transmitted diseases (*njovhera*),), infusion from fresh or dried part of barks, VO.
	Aloe globuligena	Liliaceae (Asphodelaceae)	gavakava	H(100) sexually transmitted diseases (*njovhera*),), infusion of chopped leaves, VO. or local application on sores of sharp ends of leaves
	Annona stenophylla	Annonaceae	muroro	H(100) sexually transmitted diseases (*njovhera*), infusion from fresh or dried part of roots, VO.
	Phragmites mauritianus	Poaceae	tsanga	H(100) sexually transmitted diseases (*njovhera*), rub sharp ends of leaves on wounds

3.2. Antibacterial testing

Out of the six plant species tested, only the methanol extracts of *Cassia abbreviata* and *Acacia nilotica* inhibited the growth of Gram-positive as well as Gram-negative bacteria (Table 2). In addition, acetone extracts of the two species inhibited all Gram-positive and most of the Gram-negative bacteria with the exception of *S. marcescens*. Generally acetone and methanol extracts from all the plants, showed activity against the Gram-positive bacteria except the acetone extract of *S. incanum* which did not show activity against *Bacillus cereus*. The majority of the antibacterial activity observed was in the methanol extracts with minimum inhibitory concentration (MIC) ranging from 0.5–5.0 mg/ml. Traditionally, plant extracts are prepared with water as infusion or decoctions, therefore it would seem unlikely that the traditional healer is able to extract those compounds which are responsible for activity in the methanol extracts.

The water extracts *of C. abbreviata* and *Z. africana* inhibited four Gram-positive bacteria, while water extract of *A. nilotica*, showed activity against all the Gram-positive bacteria and *Enterobacter aerogenes* a Gram-negative, thereby suggesting a broad spectrum antibacterial property of these species. This seems to justify their usage for the treatment of infections by the indigenous people of Guruve, Zimbabwe. Water extracts from *Solanum incanum, Vernonia amygdalina* and *Dichrostachys cinerea* did not show any antibacterial activity though there was activity by these plants when extracted in methanol and acetone. This is probably due to the low concentration of the extracts, 5.0 mg/ml being the maximum concentration tested in the experiment, unlike the traditional herbalists who apply the extracts with no upper limit to their concentration. Generally, the people of Guruve District of Zimbabwe still have a strong belief in the efficacy and success of herbal medicine. The broad spectrum-antibacterial activity of some of the plants used for the treatment of STDs in the district appears to have justified this belief. The antibacterial activity of the plant extracts was found mainly against the Gram-positive bacteria while Gram-negative bacteria appear to be more resistant to the plant extracts. Similar observations have been reported by several workers (Martin; Paz and Vlientinck).

Work is progressing on the process of isolation and structural identification of the bioactive compounds in these plants.

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