



Indigenous Plant-Derived Medical Applications for Primary Health Care

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Abstract

Traditional medicine is an important primary health care resource for many people and has been acknowledged as a necessary component of reaching universal health. The purpose of this research is to offer an overview of indigenous plant-derived medicinal applications administered to treat current human ailments. The data were collected via a mixed-methods research in four Bapedi communities in South Africa's Limpopo Province. The research documented six different techniques for administering indigenous plant-derived medications, including decoction, infusion, steam bath, incense, poultice, and powder. These uses are determined by the kind of plant material employed and the type of illness being treated. For instance, a leaf poultice is applied directly to wounds to promote healing, while decoctions and infusions of the root, bark, and bulb are used as purgatives and enemas to treat gastrointestinal diseases and as emetics to alleviate cough. Steam baths and incense inhalation increase sweat, which is beneficial in the treatment of fever and cough. The standard dose for decoctions and infusions is a teacup, but there are no accounts of particular dosages for poultices, steam, ash, burned root, or leaf sap. This research advises hastening the process of authenticating traditional medicine in order to assure optimal practices, such as accurate dosage uses for medications.

Keywords: *Indigenous Knowledge; Plant-Derived Medicine; Primary Health Care; Treatment of Disease*

Introduction

Traditional medicine is an important primary health care resource to many populations, and has been recognized as a component of achieving “health for all” since the Declaration of Alma-Ata in 1978 (World Health Organization’s (WHO) Strategy 2014–2023). The WHO aims to strengthen the role of traditional medicine, emphasizing the importance of promoting and including the utilization of medicinal plants in the health systems of its member countries (WHO, 2013). In developing countries, traditional medicines provide a cheap and alternative source for primary health care due to lack of modern health facilities, their effectiveness, cultural priorities, and choices (Aziz et al., 2018). Rural people residing in

developing countries are relying on traditional herbal medical system due to their strong belief in the health care mechanism (Sánchez et al., 2020). Indigenous health care mechanisms have remained as the most affordable and easily accessible source of treatment in the primary health care system of resource poor communities. Medicinal plants have been a vital source of both curative and preventive medical therapy preparations for human beings. Medicinal plants are important elements of indigenous medical systems and have proved to be efficacious in treatment of various diseases for bodily, physical, mental, spiritual and general wellbeing (Igwilllo et al., 2018). Indigenous plants had been used by every society in every period of history long before this date in order to protect or recover health (Dar et al., 2016). In many developing countries, a large proportion of the population relies on traditional practitioners and their armamentarium of medicinal plants in order to meet health care needs (Hosseinzadeh et al., 2015).

Traditional medicines are mostly herbal preparations that contain plant materials as active ingredients. A myriad of methods of preparation are used (Dar et al., 2016). Traditional medicine is administered in several methods to treat ailments taken orally or as poultice applied for skin diseases and wounds (Shankar et al., 2012). Decoction, infusion, powder and steaming are the most widely used method of preparations. Such a large variety of preparation methods that have been studied has been highlighted across studies (Chauke et al., 2025; Mutwiwa et al., 2018). Decoction and infusion are the main preparation methods for herbal teas of roots, barks and seeds. However, the type of plant species, condition of ailment being treated, and plant parts used determined the method of preparation (Aziz et al., 2018). Zhou et al. (2021) argues that the herbal preparations lack standardization due to the complex composition of the prescribed plant materials, the unclear mechanism of the formulas, and a lack of scientific data to support the dose-response relationship. Against this background, a mixed-method approach was used to describe the indigenous medicinal plant application methods for curative care.

Methods

Study Area

The study presents the indigenous medicinal plant applications applied for curative care. The study was conducted among four groups of the Bapedi in Limpopo Province, South Africa. Limpopo Province is situated in the Northern side of South Africa with an estimated population of 5.7 million, which translates into the population density of 44 people per square kilometre. The population of Limpopo contributes to 9.9% (5.9 million) of South Africa's population of 54 million. Limpopo is the fifth largest of South Africa's nine provinces covering an area of 125 755 km², which is 10.3% of South Africa's total land area (Statistics South Africa 2014 Mid-Year Population Statistics, 2021). Demographic figures show several ethnic groups distinguished by culture, language and race. The Department of Health Limpopo Province Vote No. 07 Annual Report 2019/2020 Financial Year reported improved performance in health care delivery. The report further shows that towards the end of 2020, the COVID-19 pandemic presented a new normal where future plans were revised to align them to the impact of the pandemic and therefore, recovery plans and strategies were developed to flatten the curve (Statistics South Africa Mid-Year Population Statistics, 2021).

Research Design

The vernacular names and cultural uses of all species were carefully recorded and later verified. Research was conducted between September 2018 and March 2019. The diverse medicinal uses necessitated a description of the ways in which the plant-based medicines were applied for curative care. The study is derived from a medical ethnobotanical enquiry conducted to describe the indigenous plants used to prepare curative and preventive medicine by the members of four rural communities in Limpopo Province. A combination of qualitative and quantitative research methods was employed to describe the indigenous medicinal plant applications. Interviewing via a questionnaire method was used, as well as the

application of botanical techniques for the collection, preservation and description of plant specimens for identification by the University of Limpopo's Larry Leach Herbarium. Qualitative data about the uses of indigenous plant-derived medicines and their applications was collected through in-depth interviews with participants. The eighteen medicinal plants (Table 1) were identified from the list of 89 plant species identified by community members during several medical ethnobotanical studies conducted in Limpopo Province, South Africa between 2012 and 2019.

The study participants were the local community members with knowledge of healing plants. They were 245 (115 males and 130 females) residents of four communities in four districts of the province. Participants' age ranged between 31 and 76 years. A semi-structured questionnaire was designed to collect the medical ethnobotanical knowledge of the four communities. The questions were developed in terms of the themes; knowledge of healing plants, names of the plants, plant materials used, preparation and administration methods and the types of diseases treated. The interviews were conducted face-to-face in the households of participants, followed by transect walks to identify and collect the plant voucher specimens for botanical identification. The researchers employed Thematic Content Analysis (TCA) method to analyse qualitative data, and a computer programme (SPSS) to analyse quantitative data. This method was used to determine the presence of certain words or concepts within a text or sets of texts. The data were analysed by organising them into categories based on themes, concepts, or similar features. Quantitative data were analysed through a statistical programme and the data were presented in graphs and tables. By completing the permission form, participants consented to participate in the research. Their names and identities were concealed, and the information they supplied was kept secret and utilized only for the purposes of the research.

Results and Discussion

The Treatment of Disease

Participants used two words with which they described medicine, namely *sehlare* (medicine derived from plant materials). The concept of medicine is, therefore, synonymous with plant materials from which it is derived. Examples were the leaves, bark, stems, roots and bulbs. These materials were collectively referred to as *dihlare* (medicine), singular form is *sehlare* (medicine). The plant materials of known medicinal plants were collectively referred to as medicine. These were processed in several ways before they were administered to patients.

In this study, various methods of indigenous medicinal plant preparation and administration have been documented. The methods of application were reported by traditional health practitioners and ordinary community members. The responses to the questions about preparations and dosage were generally low. This was mainly due to their insecurities, protecting traditional knowledge for competitive reasons and commercial purposes. Through the informal discussions after the interviews it was gathered that traditional healers are very unlikely to share knowledge among each other, unless in very rare cases and they should be from different areas. However, the preparation procedures and dosage not openly shared. The following are the medical preparations reported during the study:

An Infusion

Fresh or dried bark and roots are soaked in water overnight. A cold infusion is drained which is taken orally by the patient. The infusion is sometimes mixed or cooked with cereal into a thin porridge to be taken by the patient. For the treatment of gastrointestinal disorders such as diarrhoea, dysentery, stomach-ache and constipation, a patient is given an infusion. There is no proper measurement of the quantity to be taken, except for a tea-cup. Keskin (2018) supports that infusion is the most commonly used method in the use of drugs as medicine. Menale and Muoio (2014) attest that infusion is the most

common preparation method to make curative medicine. De Wet and Ngubane (2014) corroborate these findings by showing that oral administration of plant-derived medicine is the most preferred administration method in many traditional healing practices.

A Decoction

This is the most common method of using fresh and dried root, bark or bulb. Plant parts are either used wholly or crushed and boiled into water for about an hour. The mixture is filtered and the resulting liquid is administered orally to cure gastrointestinal disorders, cough, fever and headache, as well as reproductive problems. Aziz et al. (2018) and Keskin (2018) accede that the decoction as the widely accepted administrative form of herbal medicines to cure various health conditions and diseases. The dosage for decoctions is similar to the applications of infusions, which are consistent with the metal tea-cup (250ml) measurement prescribed by South African and Tanzanian traditional health practitioners (Semenya & Maroyi 2013). Mhlongo and Van Wyk (2019) show that tonics can be administered orally as a drink or as an emetic or enema, less often as a body wash or as a steam treatment. The oral administration of infusions may be associated with the existing common ailments such as abdominal pain and cough whose treatment is only effected through the mouth of a patient (Yirgu et al., 2021)

Powder

It is obtained by pestling, milling, roasting or burning the roots or bark. For the preparation of powder or ash, the root or bark must be well dried. The resulting ash or powder is taken orally with water or rubbed into incisions made in the body. It is sometimes mixed with fat and applied on the skin for the treatment of sores or wounds or applied to painful teeth. Sometimes the powder form is mixed in water and taken orally. Keskin (2018) supports that the simplest way is to administer traditional medicine is by powder form, obtained by grounding or burning dried roots and bark (Semenya & Maroyi, 2018). The measurement reported by participants was a tip of tea-spoon, which is supported by Hamiduddin et al. (2019) that in many instances there no specific measurements for the application of folk medicines.

Steaming

Another application method reported was steaming. The roots, bark or bulb is boiled in water for about an hour after which the patient is covered with a blanket and let to inhale the steam to cure conditions such as headache and body itch. Herbal steaming is ideal especially when the entire body needs treatment. It is a complete treatment that penetrates into every nook and cranny at the same time in equal proportion (Shankar et al., 2012).

Incense

Smoke from burning incense by a patient is another common method of using indigenous herbs. To loosen a cough, chips of dried root and bark are charred on a potsherd with live coals and the patient instructed to inhale the smoke emanating from the charring chips. Shankar et al. (2012) supports that to clear away post-partum blood from the womb and cough, smoking therapy can be performed.

Poultice

In the preparation of a poultice, the fresh leaf and bulb are chewed and spat on the hand-palms and rubbed on the patient's body. The same application can be used to treat *hlogwana* (pulsating fontanelle) and *khubjana* (stump). Dar (2016) concede that traditional medicine is administered as poultice applied for skin diseases and wounds.

Conclusions

The study recorded six methods of the applications of indigenous plant-derived medicines as decoction, infusion, steam bath, incense, poultice and powder. These applications are dictated by the plant material used and the nature of the disease to be treated. Leaf poultice is applied directly on the wounds to accelerate healing, whereas the root, bark and bulb decoctions and infusions are administered as purgatives and enemas to treat gastrointestinal disorders; and as emetics to treat cough. Steam bath and incense inhalation induce perspiration that cures fever and cough. Infusion, decoction, poultice and steaming are prepared from fresh leaves, roots, bark and bulbs. The incense and powder are prepared from dried bark and root. The common dosage for decoctions and infusions is tea-up measurement. There are no reports about specific dosages for poultice, steam, ash, burnt root and leaf-sap. The six medical applications are similar to the biomedical applications in which the medicines are administered orally in liquid form and as creams applied topically. The only difference is the dosage, in which the applications do not have specific doses. This study recommends improvements and control in the use of traditional medicine such as the specified dosages for the medical applications.

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