

Exploring Indigenous Practices: Medicinal Plants in Diarrhea Treatment

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ABSTRACT

Diarrhea continues to be a major global health challenge, particularly affecting children under five in developing regions. While biomedical approaches exist, traditional medicine remains a primary healthcare resource for up to 70% of the world population. Indigenous knowledge systems have long utilized medicinal plants for the effective treatment of diarrhea. This paper examines the depth of indigenous practices in treating diarrhea, with a specific focus on traditional healers' use of local flora in regions such as South Africa and South Asia. Drawing from ethnobotanical studies, field interviews, and laboratory validations, the research identifies key plant species with antidiarrheal properties and examines their bioactive compounds, such as flavonoids, tannins, alkaloids, and saponins that contribute to therapeutic outcomes. Despite their proven efficacy in folk medicine, only a fraction of these plants have undergone scientific investigation or commercialization. The paper argues for the integration of indigenous practices with modern pharmacological approaches through bioprospecting, sustainable harvesting, and knowledge protection. Bridging this gap not only improves public health responses to diarrhea but also affirms the value of indigenous knowledge in contemporary medicine.

Keywords: Indigenous Knowledge Systems (IKS), Traditional Medicine, Medicinal Plants, Diarrhea Treatment, Ethnobotany, Antidiarrheal Agents, Bioactive Compounds

INTRODUCTION

Diarrhoea is one of the most common health problems affecting a large portion of the global human population. The condition affects 3-5 billion people per year, mostly in developing countries, where it accounts for 4% of total deaths, mostly children under 5 years of age. 70% of the world population uses traditional medicine for their primary health care. Traditionally, ethnomedicine plays a vital role as it has provided inexpensive materials that are easily accessible. Ayurveda is the main system of medicine and healing in South East Asian countries, but is also recognized and practiced in many other countries. Diarrhoea is a common ailment, and the main causes are contamination of food and water, as well as infections from bacteria, viruses, and worms. Ayurvedic ancient literature mentions numerous medicinal plants for the treatment of diarrhoea. In the world, there are 350,000 plant species, out of which about 80,000 species are known for medicinal value. Of those, the medicinal effects of 10,000 species are being closely investigated, and only 1000-2000 species have been adopted for commercialization. About 20%-30% of the existing plant species have been investigated thoroughly for their medicinal value, of which 5-10% are known to be used in the traditional mode of medicine. Of the medicines that are prescribed in about 2 million prescriptions in the hospitals, at least two out of every 10 are derived from plant sources. Despite their own vast medicinal prospects, especially for their anti-diarrhoeal activity, hardly any of such plants worldwide have been investigated in the laboratory and field or put to commercial use. Moreover, only 135 out of 582 genera of the 2861 flowering plant families used worldwide have been investigated biologically for anti-diarrhoeal action. There is an urgent need for rigorous research on South Africa's Flora, which has a potential basis for the discovery of new drugs, contributing towards the health care system of the country. There is also a dire need to conduct research on the indigenous knowledge system to unravel the efficacy of the plants used and subject them to laboratory and field investigations [1, 2].

Background of Diarrhea

Diarrhea is a disorder marked by frequent, watery stools, affecting over 5 billion people annually, particularly children under five, leading to 3 million deaths each year. It poses significant socio-economic challenges. With a global population of about 7 billion, around 70% rely on traditional medicine, particularly indigenous plants, which require further scientific exploration and documentation. In India, systems like Ayurveda, Siddha, and Unani provide alternate medical practices, especially popular in Southeast Asia and recognized by the World Health Organization. Ancient Ayurvedic texts highlight the medicinal power of various plants for diarrhea treatment. There is a growing interest in scientifically validating these traditional claims, with research linking observed pharmacological activities to claimed actions of these plants. In India, 69 plant species from 41 families have shown anti-diarrheal properties. Diarrhea can also mean increased stool frequency and decreased consistency, exceeding 200g/day, and is classified into types like secretory, osmotic, and motility diarrhea. Various medicinal plants globally have been utilized to address diarrhea [3, 4].

Traditional Medicine Overview

Traditional medicine, often termed indigenous knowledge, cultural knowledge, ethno-medicine, or folk medicine, has a significant historical basis, having been practiced since the dawn of civilization. Indigenous peoples have consolidated this knowledge over time, passing it down from generation to generation. Community members are often aware of medicinal plants in their environment, knowing how to apply their active ingredients in phytotherapy. Although most key traditional medicine practices and techniques are orally transmitted, folkloric knowledge can shape standardization efforts, leading to a modern form of medicinal plants in global markets. Traditional medicine recognizes over 120 medicinally and therapeutically significant plant species of tropical and subtropical origin. Phytomedicines are drugs that are composed solely of plant parts or plant extracts. Stomach parsing and curvatures, poisonous cures, sprays, ointments, and washes are common in folk traditions. Checkers, feet stoppers, fortune tellers, herbalists, medicine men, and wedges are terms used to identify traditional medical practitioners. Commercial products are evolved plant products, such as herbal teas, infusions, and extracts. Newer developments, such as perfumery, cosmetics, fragrances, and essences, are also being studied for the pharmacological activity of plants and plant remedies used by indigenous groups. Tribal/folk medicines, propagated as traditional knowledge for centuries in a rational and observable way, are potent sources for discovering drugs with unadulterated new chemical entities. Ethno-botanically oriented investigations of wealthier plants of cluster regions present novel lead molecules for drug development. Both biodiversity and cultural human wealth are fast degrading worldwide. World heritage intellectual wealth must not meet the same grave fate that has befallen flora and fauna biodiversity. Intellectual property protection for human wealth must embrace different emphases and language compared to bio-property protection for flora and fauna. This leads to altering dispositions and logics fighting forms, as exhibited in patent laws and international agreements, to remedy bio-piracy [5, 6].

Indigenous Knowledge Systems

Indigenous Knowledge Systems (IKS) related to traditional medicine and/or herbal remedies and the related therapies and practices continue to be a significant health care source to many communities. It is in this regard that the current research was undertaken to identify and document some medicinal plant species associated with diarrhea treatments by the indigenous community of Tongatonga, King Sabata Dalindyebo Municipality, South Africa. Diarrhea is one of the most important public health concerns globally, accounting for 2,195,000 deaths each year, 76% of which are among children under five. In South Africa alone, diarrhea and gastroenteritis accounted for 52,000 deaths in 1998, with the majority being children under five, although updated figures are difficult to come by. Undoubtedly, diarrhea is a health condition that needs urgent and sustainable health care interventions and strategies. Most rural communities in South Africa, including those in the O.R. Tambo, have been historically, socio-culturally, and economically disadvantaged. Consequently, it is women's burden to care for the sick, including handling diarrhea. It has been observed that published pharmacological studies on a limited number of plants containing valuable active compounds are found, but these are neither exhaustive nor based on a comprehensive plant species association with diarrhea treatment. Nevertheless, it is generally known that some medicinal remedies prepared from indigenous plants are used to treat various diarrhea-associated ailments. However, due to the silent and covert nature of the health condition, it has been largely ignored as a researchable area of inquiry. As a result, this is the first study on wild medicinal plants among traditional healers addressed to a broader audience. There is a need to do further fieldwork with regard to

finding the other plants that healers haven't utilized as medicine plants, and on false beliefs around plants. Use of wild-harvested plants as medicinal species must involve the establishment and application of sustainable harvesting practices to preserve the health, structural integrity, and biodiversity of wild stocks. An integrated medicinal plants information system that captures, stores, and automates the management of organized information must be developed for the region [7, 8].

Medicinal Plants in Indigenous Cultures

Diarrhoea is a prevalent gastrointestinal issue common in human populations worldwide, particularly in developing countries. Key causes include food poisoning and water contamination, leading to higher mortality rates. Elders, especially indigenous healers from rural areas, are vital sources of knowledge regarding medicinal plants used to treat diarrhoea for centuries. Information gathered from local interviews highlights the significance of medicinal herbs in these communities. Numerous plants are reported to possess antidiarrhoeal properties, with both children and adults strongly believing in their effectiveness. These plants are commonly used in various forms, such as decoctions or powders, primarily from the Euphorbiaceae and Acanthaceae families. Milk also plays a significant role in diarrhoea treatment. Key phytochemicals, including tannins, alkaloids, flavonoids, and saponins, serve as principal bioactive compounds in these plants. Scientific research and identification of active principles based on folklore can lead to the discovery of new and effective anti-diarrhoeal agents. The rich traditional knowledge in rural communities sheds light on the medicinal value of numerous plants, offering potential for crude drug development and the design of improved analogs through bioassay-guided isolation of active compounds. Recording and evaluating the wisdom of folk healers can enhance the exploration of pharmaceutical applications from diverse plant resources, paving the way for new commercial anti-diarrhoeal products. Several plants have already shown experimental validation for their anti-diarrhoeal efficacy, highlighting their notable ethno-botanical and ethno-medicinal importance in local practices [9, 10].

Case Studies of Indigenous Practices

Countries with rich biological diversity possess complex and dynamic sets of traditional beliefs, health practices, and knowledge systems. In developing countries, the primary source of medication for most individuals is herbal treatment, which plays an essential role in treating curable and incurable conditions. Medicinal plants provide opportunities for pharmaceutical companies to manufacture predictable pharmacologically active compounds. Diabetes, hypertension, dyslipidemia, obesity, and cancer are common diseases prevalent in developed countries. As a potentially more effective therapy, alternative medicine is gaining popularity, and demand for information about the efficacy of medicines from plants is increasing in industrialized countries. An ethnopharmacological study was carried out to survey possible medicinal plants to treat diarrhoea. Ethnobotanical information was collected through site visits and interviews with local men. Selection was done by interview, prior knowledge, community referral, use consensus, and group discussion. A review of scientific literature was conducted to provide background information regarding the plants, along with their active constituents, toxicology, pharmacology, and clinical safety. Phytochemical selection of species was done based on sham treatment, constituting water extracts of selected plants. Diarrhoea was provoked in male Wistar rats, and antidiarrhoeal screening was done using the castor oil-induced model. The most potent species were used for isolating the active principle, plumeride. *Vaccinium myrtillus* leaf powder and *Anacardium occidentale* fruit seeds were used for their long-term safety evaluation. Medicinal plants are promising alternatives for treating gut inflammation and diarrhoea. Traditional knowledge was reviewed to elaborate on medicinal plants traditionally used by the people in the Amhara Region of Ethiopia to treat diarrhoea. Plants mentioned in literature with no traditional knowledge or scientific data about their traditional medicinal use were excluded. Diarrhoea is associated with the inflammation of the gastrointestinal tract and characterized by excessive loose stool, which usually occurs simultaneously with abdominal pain, vomiting, and flatulence. Essential oils and extracts from plants are widely used in traditional medicine for their efficacy in treating diarrhoea. Medicinal plants used to treat diarrhoea have also been reported from other parts of Africa and the world [11, 12].

Scientific Validation of Indigenous Practices

Indigenous practices are oral traditions that have been passed down among sustainable communities living in bioregions. There is often a lack of scientific validation for the efficacy of these practices. This study focused on medicinal plants used for diarrhea treatment in the Lusikisiki area of the Eastern Cape, South Africa. A questionnaire was distributed to traditional healers to determine the plants they use for this condition, while scientific literature was reviewed for evidence of their efficacy. Twenty-three plants

from eight families used for diarrhea treatment were identified, with eleven plants having multiple species. Most plants were administered via infusions, and evidence supports the use of ten of these plants against diarrhea. Diarrhea affects 3 to 5 billion people annually and is a leading cause of death in children under five. Although various traditional practices exist for treating diarrhea, scientific validation is often missing. Notably, medicinal plants in rural Eastern Cape have not received extensive research attention, and many antidiarrheal species noted in South Africa have been primarily documented in Zimbabwe. A case study on diarrhea treatment among the Sotho-Tswana traditional healers in Mpumalanga Province has garnered some focus. Therefore, a survey was needed to document the plants used by Lusikisiki traditional healers. Indigenous practices include the bioprospecting and management of medicinal plants, contributing to the prevention and treatment of ailments like diarrhea, especially in rural areas with limited healthcare access. The traditional healers in Lusikisiki possess biocultural knowledge that has been amassed through generations regarding the medicinal properties of local plants [13, 14].

Challenges Facing Indigenous Practices

The socio-economic evolution of Africa, including the incessant yet acceptable shift from the rural to urban areas and the consequent changes in living conditions, has overshoot indigenous medicinal plant usage and knowledge. Although more readily available western drugs and health care facilities have emerged and proliferated, the indigenous African healing practices still prevail in many settings, silently offering sundry treatment approaches and mostly unexamined strategies to exploit indigenous plants in drug discovery for a multitude of ailments, including diarrhoea. However, fecal-oral transmission, with the gastrointestinal tract as aural vectors being the culprit, has not lagged, perpetuating the popular HIV/AIDS myth: 'only jungles are sick'. Diarrhoea is thus the third leading cause of morbidity among children under five and number one in less developed countries, exceeding 2 million deaths each year. Therefore, the quest for drugs against diarrhoea is paramount, and medicinal remedies with proven pharmacological bases will be key. In Africa's rural hinterlands, medicinal remedies prepared from indigenous plants of myriad genera and species such as Ficus, Annona, Albizia, Acacia, Phytolacca, Citrus, Hibiscus, Tephrosia, Zingiber and Myrsine, all forming the drug candidates herein examined, are almost always the only readily accessible and affordable therapies for the control of diarrhoea. Extracts, decoctions, or ashes of the bark, fruit, leaves, root, and stem of these diverse plant parts are in daily use as remedies locally claimed to be efficacious in controlling diarrhoea in the enigmatic young ones. The literature is rich with information on the anti-diarrhoeal activities of these same plants, and some of the active components have been scientifically validated in rats, mice, and rabbits by both bioassay and bioassay-directed fractionation methods. The anti-diarrhoeal activity of these plants has generally been found to be due to the presence of tannins, alkaloids, terpenoids, saponins, flavonoids, or steroids. However, only herbal materials from two of these plants have eventually found themselves on the pharmaceutical shelves as anti-diarrhoeal agents after several years of testing for safety and clinical evaluation. It is thus evident that the potential of native plants, notwithstanding the use of unproven remedies, is boundless [15, 16].

Integrating Indigenous Knowledge with Modern Medicine

In developing countries, diarrhea remains an important cause of illness and a major health concern, especially among infants and children. Due to its exposure to different acidic environments and toxins, diarrhea is a condition mainly associated with the gastrointestinal system, specifically the intestines, and usually leads to other symptoms in the body. It cannot solely be considered a condition associated with the intestinal tract, because it may lead to malnutrition, weakness, dehydration, and even death. New therapeutic agents are desired due to the side effects of existing agents, thereby forcing many to search for therapeutic agents in medicinal plants. Medicinal plants have been used to treat different ailments due to their accessibility, economic feasibility, and perceived efficacy for years. Knowledge of plant-based indigenous medicine and their therapeutic significance practiced for the treatment of diseases varies widely; nevertheless, herbal drugs are not well established, especially in developing nations. Despite the rapid development in contemporary medicine, a large portion of the world population, particularly in developing countries, relies on the indigenous health care system, particularly the herbal drug system, for their primary health care. A significant portion of the world population uses traditional and indigenous medicine. Literature has claimed the medicinal effects of many plants based on folk knowledge, thereby stimulating and encouraging ethnobotanical and ethnomedicinal works. The database on the traditional use of medicinal plants reveals the usage of numerous plant species. Out of these reports, a significant percentage is accounted for by Africa. African veterinarians consulted local botanists and traditional healers, reporting lots of usage of plants as antidiarrheal drugs. Due to the advancements of synthetic

drugs, pharmaceutical firms and industries have less interest in indigenous medicinal plants. Traces of awareness regarding the adoption of modern medicine to indigenous medicine are found in Africa. Literature was studied to obtain knowledge on the industrialization of traditional medicines. Community knowledge on herbal medicine in the management of pediatric diarrhea, as well as several anti-diarrhea plant species reported in Ethiopia [17, 18].

Future Directions in Research

The era of natural product isolation and identification is rapidly shifting to exploration at the molecular level to understand their pharmacological properties. Although the huge therapeutic potential of phytoconstituents is known, the search for new and selective molecules that act on a given receptor is still questionable. In this regard, traditional medicinal knowledge holds a treasure of information that requires scientific validation. A range of biological activities, including antibacterial, antipyretic, anti-inflammatory, antiproliferative, antidiabetic, and antimalarial, over the last two decades, have been attributed to various medicinal plants used in the traditional system of medicine. Few investigated tribal medicinal plants have been confirmed scientifically for their neuronal and metabolic dysfunction. Research Scope The study of antidiarrheal activity of indigenous knowledge as a potential candidate of folk medicine and reporting the scientific validation is a crucial research area that needs attention. Thus, the therapeutic significance of indigenous knowledge should still be reviewed, verified through extensive field studies, phytochemical investigations, and elaborate biological screening to find out their active principal compounds with new pharmacological actions. Current attention should also be given to optimizing the efficacy of the already scientifically validated indigenous knowledge. The public perception and acceptance of herbal medicine has recently increased higher than pharmaceutical drugs, which has drawn the commercial interest of agriculture, pharmaceuticals, the smaller unorganized sector of the herbal industry, and even international trading status. A large herbal raw materials market exists, which is poorly regulated and presents an opportunity for adulteration and unethical trading. Therefore, along with the biodynamic investigations, the notion of awareness about quality control methods, biological standardization protocols, database of Himalayan medicinal plants trade should be of current interest. The ecological, pharmacological research to estimate the vulnerability of the endangered and threatened plant species should also be emphasized [19, 20].

Policy Implications

The study of traditional health care is intricate, spanning various disciplines. It is essential to examine this field from multiple scientific perspectives. Key areas of traditional healing in South Africa encompass: (a) Traditional Healing, (b) Indigenous Belief Systems, (c) Medicinal Plants, (d) Indigenous Medicinal Knowledge (IMK), and (e) African Healing. These aspects include beliefs, practices, and tools used in indigenous treatments, as well as the efficacy and safety of medicinal plants. Various practitioners, like traditional healers, herbalists, and Mbayi, utilize these methods. Indigenous beliefs, spirituality, and ancestral connections also play crucial roles in traditional medicine. Many African plants are recognized for their medicinal properties globally; however, systematic scientific research on African traditional beliefs is still needed. This aligns with goals like black empowerment, African renaissance, and the development of new institutions that honor black African traditions. There is an urgent call for scientific inquiry into IMK and the plants utilized in these practices. This exploration holds significant scientific promise, contributing to local and global discussions on the preservation of traditional knowledge and practices. Black empowerment, self-determined content, and indigenous knowledge systems will be thoroughly examined in the context of traditional healing practices [21, 22].

Community Involvement and Education

Two workshops were conducted. A pre-workshop was held to rehabilitate community members. Assisting as researchers in the project was the next stage in exploring the medicinal plants used for diarrhea treatment. Training was provided on how to gather and record information from other community members, assigning time to collect the information, and then compiling a report. This report would become the basis for a new publication. Many older community members were responding positively to this plan, complementing the workshop for its involvement of the community in the process. They would be happy to share their knowledge about the plants used in diarrhea treatment, both for their community and beyond. The only caveat was the need to establish a formal research agreement between the institutions involved in the research team and the traditional communities involved. The possibility was raised of the production of a booklet describing the results of the research for distribution to the schools and health clinics in Maori areas. This initiative was warmly welcomed by the participants. In the second workshop, both women and men from the community described their practices in growing, gathering, and

using herbal medicines, treatments for stomach ailments, and aniseed for its anti-bloating attribute. Two male participants described their experience as gardeners of traditional plants and their love for growing them to provide the community with nectar outside of doctors and chemists. The general view expressed was that the benefits of these traditional plants outweighed the harm. Participants described that the gathering of knowledge is a communal experience as the traditional owners invite the public into the forest to share rare knowledge about the uses of native plants as remedies for ailing health, crafting, and other needs. Discussion was initiated about how different their practices are from other communities. The assertion was made that a community, properly named a hapasu, must exist; otherwise, the knowledge would not be as clear or as pure. This avenue of discussion extends well beyond the field of health and into how individuals with special knowledge best share that knowledge without its misuse. There was strong encouragement for the notion of budding new researchers from the community, and that the experience can be eye-opening and empowering. The traditional practitioners felt refreshed by it and were encouraged in their claim to be the custodians and knowers of the land and its plants [23, 24].

CONCLUSION

Indigenous medicinal practices offer a rich, yet underutilized, reservoir of solutions for managing diarrhea, a condition that continues to afflict millions annually. Across diverse regions, from the Eastern Cape of South Africa to the Ayurvedic traditions of South Asia, communities have long depended on local plant species with potent therapeutic effects. While empirical use demonstrates promising outcomes, the lack of scientific validation, standardization, and policy integration hampers the broader adoption and commercialization of these remedies. The pharmacological potential of antidiarrheal plants like *Ficus*, *Albizia*, and *Zingiber* warrants deeper investigation and strategic incorporation into formal healthcare systems. Moving forward, collaborative research that respects and protects indigenous intellectual property, promotes sustainable harvesting, and fosters policy frameworks will be critical in elevating traditional knowledge into global health solutions. Recognizing and validating these ancient practices can pave the way for safer, accessible, and culturally respectful approaches to diarrhea treatment and public health more broadly.

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