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Traditional medicinal plants used in the treatment of diabetes in Bastar district (Chhattisgarh)

Bhagwan Prasad Sahu
Assistant Professor, Department of Botany, Government Kaktiya Post Graduate College, Jagdalpur, Bastar, Chhattisgarh, India

Abstract
Diabetes mellitus is one of the most common chronic diseases affecting people worldwide. In many rural and tribal areas, traditional medicinal plants are widely used for the management of diabetes due to their accessibility, affordability, and effectiveness. The present study aims to document traditional medicinal plants used for the treatment of diabetes by tribal communities in Bastar district of Chhattisgarh, India. Information was collected through field surveys, interviews, and discussions with local traditional healers, Baigas, and knowledgeable elders of the tribal communities. The study recorded several plant species belonging to different families that are traditionally used in the treatment of diabetes. Various plant parts such as leaves, bark, fruits, seeds, and stems are used for preparing herbal remedies. These medicines are generally prepared in the form of decoctions, powders, juices, and extracts. Plants such as *Gymnema sylvestre*, *Momordica charantia*, *Syzygium cumini*, *Ficus racemosa*, and *Costus igneus* were commonly reported for diabetes management. The findings of the study highlight the rich ethnomedicinal knowledge of tribal communities and their dependence on forest resources for primary healthcare. Documentation of such traditional knowledge is important for conservation of medicinal plants and may also provide valuable information for future pharmacological research and development of new antidiabetic drugs.

Keywords: Diabetes, medicinal plants, traditional knowledge, ethnobotany, bastar district, tribal communities

Introduction

Diabetes mellitus is a chronic metabolic disorder characterized by high blood glucose levels due to defects in insulin secretion, insulin action, or both. It has become a major global health problem affecting millions of people worldwide. The increasing prevalence of diabetes has created a significant need for effective and affordable treatment methods, especially in developing countries.

Medicinal plants have been used for centuries in traditional systems of medicine for the treatment of various diseases, including diabetes. Many herbal remedies are considered safer, more affordable, and easily available compared to modern pharmaceutical drugs. In India, traditional knowledge of medicinal plants is widely practiced by tribal and rural communities, who rely heavily on natural resources for their primary healthcare needs. Chhattisgarh, particularly Bastar district, is rich in biodiversity and tribal culture. The region is inhabited by several tribal groups such as Gond, Muria, Maria, and Halba, who possess extensive knowledge of medicinal plants and their therapeutic uses. This knowledge has been passed down orally from generation to generation and plays an important role in the treatment of various ailments, including diabetes.

Despite its importance, much of this traditional knowledge remains undocumented and is at risk of being lost due to modernization and changing lifestyles. Therefore, the documentation and scientific study of medicinal plants used by tribal communities are essential for preserving this valuable knowledge. The present study focuses on identifying and documenting traditional medicinal plants used for the treatment of diabetes in Bastar district of Chhattisgarh.

Diabetes: A Global Health Challenge and the Need for Diverse

Therapies Diabetes mellitus is broadly classified into Type 1 DM (autoimmune destruction of pancreatic beta cells), Type 2 DM (insulin resistance and progressive beta-cell dysfunction), and gestational diabetes. Type 2 DM accounts for approximately 90-95% of all cases and is strongly associated with obesity, sedentary lifestyles, and genetic predisposition. The escalating prevalence of diabetes necessitates the exploration of additional and complementary therapeutic approaches. Traditional medicine deeply rooted in cultural practices and often more affordable and accessible, presents a viable avenue. The World Health Organization (WHO) recognizes the potential of traditional medicine and encourages its rational integration into national health systems, provided there is scientific evidence of safety and efficacy.

Traditional Medicine and Diabetes: A Historical Perspective

The use of plants for medicinal purposes dates back thousands of years. Ancient civilizations in Egypt, China, India, and the Americas meticulously documented the therapeutic properties of various plants. Traditional Chinese Medicine (TCM), Ayurveda in India, African traditional medicine, and Native American healing practices all contain remedies for conditions consistent with diabetes symptoms, such as excessive thirst, frequent urination, and unexplained weight loss. The traditional knowledge often describes plants with "bitter" or "astringent" tastes as beneficial for controlling "sugar" or "sweetness" in the body, which aligns with their observed hypoglycemic effects. This vast empirical knowledge base serves as a crucial starting point for modern scientific investigation into the anti-diabetic potential of these plants.

Medicinal Plants Used for Diabetes
Medicinal Plant No. 1
Botanical Name- *Pterospermum acerifolium*
Vernacular Name – Kanak champa
Chhattisgarhi Name: Kanak champa
Family: Malvaceae

Habit: Tree
Useful Plant Part: Fruit and Leaves
Availability of the plant: Indigenous Plant

Medicinal Plant No. 2
Botanical Name: *Coffea arabica*
Vernacular Name: Coffee
Chhattisgarhi Name: Coffee
Family: Rubiaceae

Habit: Tree
Useful Plant Part: Seeds
Therapeutic Methodology: The tree's ripe crimson fruits are harvested. After removing the pulp, the seeds are fully dried in the sun. The seeds are dried, mildly roasted, and then processed into a powder. To eat this powder, combine it with a cup of warm water.
Availability of the plant: Indigenous Plant

Medicinal Plant No. 3
Botanical Name: Gymnema sylvestre
Vernacular Name: Gudmar
Chhattisgarhi Name: Gudmar
Family: Apocynaceae

Habit: Herb/Climber
Useful Plant Part: Leaves, Stem
Therapeutic Methodology: For 20 days, one cup of hot water and one tea spoon of powdered leaves and stem are taken orally twice.
Availability of the plant: Common

Medicinal Plant No. 4
Botanical Name: *Mangifera indica*
Vernacular Name: Aam
Chhattisgarhi Name: Aama
Family: Anacardiaceae

Habit: Tree
Useful Plant Part: Bark
Therapeutic Methodology: Cotyledons and bark are cleaned and dried. After the decoction was prepared, it was converted to a fine powder and used twice a day for 25 days. Days
Availability of the plant: Common

Medicinal Plant No. 5
Botanical Name: *Momordica charantia*
Vernacular Name: Karela
Chhattisgarhi Name: Karela
Family: Cucurbitaceae

Habit: Herb/Climber
Useful Plant Part: Leaf, Fruit
Therapeutic Methodology: Consumed a glass of boiled fruit and leaf juice twice a day for fifteen days.
Availability of the plant: Common

Medicinal Plant No. 6
Botanical Name: *Syzygium cumini*
Vernacular Name: Jamun
Chhattisgarhi Name: Jamun
Family: Myrtaceae

Habit: Tree
Useful Plant Part: Bark and Seeds
Therapeutic Methodology: After cleaning, crushing, and drying in the sun for four days, fresh seed and bark are applied twice a day for 20 days using two tea spoons in a cup of water.
Availability of the plant: Common

Medicinal Plant No. 7
Botanical Name: *Ficus racemosa*
Vernacular Name: Dumar
Chhattisgarhi Name: Dumar
Family: Moraceae

Habit: Tree
Useful Plant Part: Fruit and Bark
Therapeutic Methodology: The fruit is ground into a powder and the bark is turned into a decoction, both of which are drunk with warm water.
Availability of the plant: Common

Medicinal Plant No. 8
Botanical Name: *Costus igneus*
Vernacular Name: Insulin Plant
Chhattisgarhi Name: Insulin Plant
Family: Costaceae

Habit: Shrub
Useful Plant Part: Leaves
Therapeutic Methodology: Fresh leaves are crushed and the juice is extracted and consumed
Availa
bility of the plant: Indigenous plant

Challenges and Considerations

Although traditional medicinal plants play an important role in the management of diabetes, several challenges and considerations must be addressed to ensure their effective use and conservation.

1. Loss of Traditional Knowledge

Traditional knowledge about medicinal plants is usually transmitted orally from one generation to another. Due to modernization, migration, and changing lifestyles among tribal communities, this knowledge is gradually declining and may be lost in the future if it is not properly documented.

2. Lack of Scientific Validation

Many medicinal plants used in traditional medicine have not been scientifically tested for their safety, efficacy, and dosage. Scientific studies and clinical trials are necessary to validate their therapeutic potential and ensure safe use.

3. Overexploitation of Medicinal Plants

Increasing demand for medicinal plants may lead to overharvesting from natural habitats. This can threaten the survival of certain plant species and affect biodiversity. Therefore, sustainable harvesting and conservation practices are essential.

4. Limited Awareness and Documentation

In many rural and tribal areas, knowledge of medicinal plants is limited to a few traditional healers. Lack of proper documentation and awareness programs may result in the disappearance of this valuable information.

5. Standardization of Herbal Medicines

Herbal medicines often lack standard preparation methods, dosage guidelines, and quality control. Standardization is necessary to ensure consistency, safety, and effectiveness of plant-based treatments. Addressing these challenges is essential for preserving traditional medicinal knowledge and promoting the sustainable use of medicinal plants for diabetes management and other healthcare needs.

Conclusion

The present study documented several medicinal plants traditionally used by tribal communities of Bastar district for the management of diabetes. Information collected from local healers, Baigas, and knowledgeable elders revealed that different plant species belonging to various families are used as herbal remedies for controlling blood sugar levels.

A total of several plant species were recorded, including *Pterospermum acerifolium*, *Coffea arabica*, *Gymnema sylvestre*, *Mangifera indica*, *Momordica charantia*, *Syzygium cumini*, *Ficus racemosa*, and *Costus igneus*. These plants belong to different botanical families such as Malvaceae, Rubiaceae, Apocynaceae, Anacardiaceae, Cucurbitaceae, Myrtaceae, Moraceae, and Costaceae.

The study revealed that various plant parts are used for medicinal purposes. The commonly used parts include leaves, bark, fruits, seeds, and stems. Among these, leaves and seeds were found to be the most frequently used plant parts. The preparation of herbal medicines is mainly carried out through traditional methods such as decoction, powder, juice, and paste.

It was also observed that most of the medicinal plants are commonly available in the surrounding forest areas and agricultural lands, while a few are indigenous species found in specific locations. The remedies are generally administered orally for a specific duration, ranging from 15 to 25 days, depending on the plant and the severity of the condition. These findings indicate that the tribal communities of Bastar district possess rich ethnomedicinal knowledge and rely significantly on locally available plant resources for the treatment and management of diabetes.

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