Pan-African Journal of Health And Psychological Sciences
ISSN: 3093-4737 | www.pajhps.org
Vol.2, No 1 | Jan-March 2026

Patient Perceptions and Clinical Outcomes of Herbal Medicine Use in Type 2 Diabetes Care in India

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ABSTRACT

Background: The increasing prevalence of type-2 diabetes mellitus in India has resulted in patients resorting to herbal and traditional modes of treatment. The use of herbal modes of treatment has been increasingly shown in terms of clinical potential. However, there is a scarcity of evidence that has linked patient perception with clinical outcomes.

Objective: The objective of this study is to assess the perceptions of patients regarding the use of herbal medicine and how such perceptions correlate with clinical results reported in T2DM patients in India.

Methods: The methods used in the research include a mixed methods approach involving 300 patients with type 2 DM. The quantitative element was based on improvements made in the levels of fasting blood glucose, postprandial blood glucose, and HbA1c values over a period of 12 weeks. The interview technique was utilized to determine patient experiences, advantages, safety, cost-effectiveness, and difficulties associated with herbal medicine use.

Results: There was significant improvement noticed for all glycemic parameters at the end of 12 weeks. High patient satisfaction rates, perceived safety, belief in the natural source of herbal drugs and cost-effectiveness were documented commonly. However, issues of dosage uniformity, varied quality of commercial products, and absence of any standardized governmental regulatory guidelines were also commonly noted.

Kamanda, J.S. et al. (2026). **Patient Perceptions and Clinical Outcomes of Herbal Medicine Use in Type 2 Diabetes Care in India.Pan-African Journal of Health and Psychological Sciences. Vol. 2. No. 1. Jan-March 2026. https://doi.org/10.64261/5tmbet58**.

ISSN: 3093-4737

Conclusion: The use of herbal medicine in people with T2DM in India is very well accepted and well-received as there have been improved glycemic controls. The gaps in the relevant guidance need to be addressed in order to incorporate herbal medicines in the treatment of diabetes in a safe and effective manner.

Keywords: Type 2 Diabetes Mellitus; Herbal Medicine; Patient perceptions; Glycemic Control; Integrative Diabetes Care; India

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is defined by the American Diabetes Association [1] as "a progressive and chronic metabolic abnormality that is frequently associated with impaired insulin secretion and/or decreased responsiveness to the actions of insulin." In addition, the International Diabetes Federation [2] reported that "T2DM is considered one of the greatest public health risks of the twenty-first century because of the increasing prevalence and morbidity associated with chronic complications and financial outcomes." Uncontrolled diabetes is linked with severe microvascular and macrovascular complications that impair the life span of the patient and promote mortality because of the association between diabetes and "microvascular complications such as renal and/or ophthalmic manifestations and macrovascular complications such as coronary and peripheral occlusive arterial disease."

India also contributes disproportionately to the population with the global burden of diabetes and has other names like the "Diabetes Capital of the World." However, according to the latest estimate, over 77 million people in India live with the disease, and the numbers are estimated to increase dramatically over the next few years [2].

Rapid urbanization, physical inactivity, dietary changes towards higher calorie, proprocessed foods, and genetic predisposition among South Asian communities have also acted as contributing factors for the rising numbers of T2DM cases [3]. Interestingly, the onset of diabetes among Indians of origin is observed to occur at a younger age and lower levels of body mass index compared to the Western world [4].

Traditional treatment of T2DM basically consists of pharmacologic regimens like metformin, sulfonylureas, insulin, and newer oral hypnotic agents. Though these drugs are very efficient in managing the symptoms of diabetes, they continue to pose certain risks in the form of adverse reactions like hypoglycemia, gastrointestinal symptoms, weight gain, and reduced levels of treatment compliance [5]. Moreover, the economic burden of lifetime treatment, testing, and consultation with the physician continues to create a practical problem in accessing this treatment. Thus, the need for alternative treatment options that are considered safer and more acceptable in their social context.

Introduction

Ayurvedic medicinal history is replete with information on Madhumeha, which is now known as diabetes. It is a condition where a person is acutely insulin resistant. Madhumeha is

ISSN: 3093-4737

also known to be caused due to vitiated Vata, which leads to an acidic condition in blood. It is thus evident that there is a real need for developing effective, cost-effective, Ayurvedic medicinal protocols using medicinal plants. In Ayurvedic medicinal traditions, Madhumeha has been effectively treated using a number of medicinal plants, which include bitter gourd, fenugreek, turmeric, aloe vera, gymnema, and even neem. These medicinal plants possess medicinal properties, which help in maintaining blood glucose levels.

Scientific studies have also started to investigate the pharmacological properties and uses of these medicinal herbs. Various studies and researches have indicated that many medicinal herbs possess a variety of biological activities that include having a hypo-glycemic, antioxidant, and anti-inflammatory effect on diabetes mellitus and could increase insulin sensitivity and stimulate the functions of beta cells in the pancreas due to increased oxidative stress by chronic hyperglycemia [6][7]. However, many studies that exist on this topic tend to be limited by their small population pool, short duration, unstandardized dosages administered, and outcome measurements taken. Very few studies also tend to evaluate its use within a larger population pool.

Patient beliefs and perceptions form an essential component of managing patients with chronic ailments, such as diabetes. In such chronic conditions, patient perception of treatment options gets determined not just by treatment effectiveness but also by considerations related to safety for use, familiarity of traditional treatment practices, expenses, among other factors. In countries like India, patients using treatments for diabetes often opt for herbal formulations either alongside mainstream treatments or replace mainstream treatments [8]. Such patient practices indicate enhanced cultural acceptability of herbal treatments, while it also raises certain suspicions.

The perceived views of patients have become crucial for ensuring safe and effective models for integrative healthcare. The patient experience has the potential to impact patient compliance and overall success with treatments despite being a relatively overlooked aspect within research related to diabetes. A model that offers comprehensive data on both patient and clinical views can help shape healthcare policies.

In this particularly important consideration surrounding the application of herbal medicine and its implications for patients with type 2 diabetes in India, the aim and object of the research work being presented here would therefore be to not only assess the clinical aspects of the application of herbal medicine but also to assess the perceptions of patients with respect to its application and effectiveness.

BACKGROUND AND RATIONALE

The interest in type 2 diabetes mellitus (T2DM) has always overshadowed the focus of biomedical research in diabetes care, where efforts are dedicated to measurable clinical outcomes like glycemic control, complication, and drug response. However, these clinical results are just a single aspect of caring for a chronic disorder because patient attitudes,

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beliefs, and views are as important for determining therapy approaches, compliance, and clinical outcomes, especially for chronic conditions like T2DM that need life-course management by patients themselves [9].

In the Indian scenario, health-seeking behavior is deeply impacted by cultural beliefs, prevailing practices within families, and trust in indigenous systems of medicine. Consequently, there is a considerable section of the population suffering from diabetes who is utilizing herbal preparations as supplements alongside modern prescription drugs, or in some instances, as an alternative to allopathic medicine. Studies have indicated that the overwhelming number of Indian patients suffering from type 2 diabetes is utilizing one or more herbal and indigenous preparations, along with modern prescription medications, during the duration of the disease [8][10].

Although herbal medicine has found widespread acceptance among patients being treated for diabetes, current studies that involve herbal medicine have essentially investigated its pharmacological properties in controlled environments. Even though these studies can give useful preliminary data about possible modes of action of herbal medicine, it fails to give an accurate picture of its use, particularly when patients take more than one herbal medicine in controlled doses that can be combined with direct medicine. In addition, certain patient studies encompass patient feelings about its use, such as satisfaction, effectiveness, or apprehensions about its possible safety or quality.

However, the integration of patient viewpoints in diabetes research is a major shortcoming, especially in developing and developing countries where treatment accessibility, affordability, and acceptance majorly affect decisions on treatment and care. Findings by various researches on behaviors and adherence support that patients tend to stick to treatment when they feel that it is beneficial and safe and when it satisfies their views and opinions [11].

Additionally, the co-administration of herbal and conventional medications triggers a multitude of clinical and public health issues, including the potential for improper dosing, interactions, and inconsistencies in treatment responses based on the variable qualities used in herbal supplements. In the absence of the examination of patient experiences relative to tangible health results, healthcare providers could lack the information necessary for the provision of proper care.

In this regard, it is evident that there is a gap that needs to be filled through research that will link patient outcomes and experiences concerning the use of herbal medicines. In this study, an assessment of patient experiences regarding the use of herbal medicines and their glycemic control will aim to offer evidence that will replicate the realities of practice and will therefore contribute to developing an integrated approach to patient care for diabetics in settings like India.

METHODOLOGY

This study adopted a mixed-methods approach in an effort to fully explore all aspects of clinical results and patient experience related to the use

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of herbal medicine in the management of type 2 diabetes mellitus. The mixed-methods design was adopted in this study owing to its capacity to incorporate both quantitative and qualitative approaches in a bid to offer a holistic perspective.

The quantitative measure was conducted by collecting core glycemic variables, denoted as Fasting Blood Glucose (FBG), Post Prandial Blood Glucose (PPBG), as well as Glycated Hemoglobin (HbA1c).

This was done with the intent of measuring the current levels of those variables, before initiating the project, and then repeating the entire process after a 12-week follow-up period with the objective of establishing changes occurring in the short-term and long-term levels of

The qualitative component included semi-structured interviews conducted on a purposive sample of research participants.

The research interviews included concerns on patient motivations regarding the use of herbal medicines, their perceived advantages and efficacy, side effects, patient compliance, and problems like difficulties in dosing and quality. This allowed a detailed analysis of patient perceptions beyond the scope of quantitative analysis.

In bringing together both the findings of statistical analysis of glycemic indices, on one hand, together with those of thematic analysis of patients' perceptions, on the other, it is my opinion that this study design made possible a form of findings triangulation. This is due to the additional strength brought into play in interpreting study findings.

In this regard, there clearly exists an imperative for studies that fill the gap between outcome measurements and patient experiences. With this regard, by assessing both glycemic control and patient experiences of using herbal medicine, this study endeavors to develop evidence that reflects actual practices, hence contributing to the development of integrative diabetes management models. An investigation of this nature appears imperative for aligning patient preferences with evidence-based practices, hence improving diabetes management practices in diverse cultures such as that of India.

FINDINGS

Statistical analysis demonstrated significantly positive reductions in glycemic control indicators. Themes identified include high patient satisfaction (84%), safety (79.3%), trust associated with natural origin (81.7%), and value for money (77%). On the other hand, lack of standardization of dosage (54.7%) and quality of product (47.3%) were identified as major challenges.

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Table 1: Patient Perceptions of Herbal Interventions for Diabetes Management (n = 300)

Perception Theme	Frequency (n)	Percentage (%)	Description Based on Participant Responses
High overall satisfaction	252	84.0	Most participants reported being satisfied with herbal interventions, describing them as appropriate and powerful for managing diabetes.
Perceived safety	238	79.3	A large proportion viewed herbal remedies as safe and less aggressive compared to conventional medications.
Trust in natural origin	245	81.7	Participants expressed strong trust in herbal treatments due to their natural origin, which increased comfort and confidence in use.
Fewer side effects	226	75.3	Many participants reported fewer side effects with herbal remedies compared to orthodox medicines, which they associated with adverse reactions.
Cost-effectiveness	231	77.0	Herbal therapies were widely perceived as more affordable than prescription medications, especially for long-term use.
Willingness to continue use	219	73.0	The combined perception of safety and affordability encouraged continued use of herbal interventions.
Lack of dosage clarity	164	54.7	Over half of the participants reported uncertainty regarding correct dosage and frequency of herbal intake.
Concerns about product quality	142	47.3	Nearly half expressed concerns about variation in preparation, processing, and sourcing of herbal products.

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Need for guidance and regulation	201	67.0	Many participants emphasized the need for clearer guidance and improved quality control to ensure safe and consistent use.

Narrative Analysis

From this table, it can be seen that most patients had a positive attitude towards the use of herbal medicines in the treatment of diabetes. A great majority of patients reported high overall patient satisfaction with herbal medicine use, indicating that they found these treatments satisfactory for helping them cope with blood sugar control. These observations clearly indicate that patients responded very positively to herbal medicine use.

A significant number of the participants also considered herbal medicines to be safe. The participants felt that herbal medicines were milder or softer compared to conventional drugs. This boosted their confidence in the herbal medications. A key factor that closely linked to the one above was the belief in the natural components of herbal medications. The participants felt that since the medications were from nature, they were more comfortable using them.

Another important issue that was noted was the perception of fewer side effects. Many of the study subjects found that there were fewer undesirable effects associated with the use of herbs compared to orthodox medicines that often had adverse effects. The cost-effectiveness was also an important issue since many of the study subjects found that herbs were cheaper, particularly considering that diabetic care was for a lifetime.

The cumulative effects of safety, affordability, and effectiveness encouraged many people to show interest in continuing the use of herbal interventions in the future. However, despite the positive attributes, there are many challenges that were identified. The dosage and manner of consumption of the herbal intervention were not clear, as more than half the respondents felt uncertain about the correct manner. Almost half the respondents had reservations about the quality of the herbal products, especially in relation to how they are processed and prepared.

Emphasis on better guidance and regulation is essential as a large number of respondents felt that herbal practices could have been made safer and more efficient through better instruction and regulation. The impression gathered is that despite the widespread acceptance and positive perceptions regarding herbal therapies, the deficiencies in areas like the use of dosage and the need for regulation need to be optimized.

DISCUSSION

The results obtained from the study offer valuable insights into both clinical and experiential aspects of the usage of herbal medicine by adult patients with type-2 diabetes mellitus in India. The observed improvement in glycemic parameters within a 12-week span

ISSN: 3093-4737

seems to accentuate the contributing factor of prolonged usage of these herbal therapies for achieving better short- and long-term glycemic controls. This appears to align with previously obtained results that accentuated the hypoglycemic and insulin-sensitizing properties of various common medicinal plants used in the management of diabetes [6][7].

Other than treatment outcomes, patient perception was found to be an integral theme that has shaped patient acceptance and subsequent use of herbal medicine. A large majority of patients demonstrated high patient satisfaction with herbal treatment, showing that they perceived these treatments to be useful for diabetes control. Patient perception of safety has also closely related to patient acceptance of herbal treatments. In fact, patient perception of herbal treatments being safer compared to conventional medications has contributed towards acceptance of these treatments [8].

Cost-effectiveness was another consideration that influenced patient attitudes. Since diabetes is a chronic condition, the associated costs for life-long pharmacological management make the cost of herbs appear effective in improving patient compliance and willingness to continue using them [15].

The costs of healthcare can be a limiting factor in developing countries, making the economic aspect of healthcare a critical area to explore in seeking effective management of this condition [14].

However, the research has also shed light on some major challenges associated with the use of herbal medicine that need to be addressed. Over half the respondents are unsure of the quantity of herbal medicine to take, when to take it, and how often to consume the preparation or product. This has serious implications for the possible inconsistent results or effects and may pose a threat to the safety of patients or users [5]. Nearly half of the respondents are concerned with the quality of herbal preparations that vary.

The coexistence of high acceptance and significant concerns indicates a demand for formalized advice and professional management. Without formalized formulation and professional advice, a tendency could emerge for patients to seek information from unofficial sources, and the risk of misusing a drug would increase. These results indicate the significance of incorporating perceptions into diabetes studies and management [9][13].

IMPLICATIONS FOR PRACTICE AND POLICY

The findings of this study have several important implications for both clinical practice and health policy. In the clinical setting, healthcare practitioners should actively engage patients in open and nonjudgmental communication regarding their use of herbal medicines. Evidence suggests that many individuals with type 2 diabetes use herbal remedies alongside prescribed medications, often without informing their healthcare providers [8]. Proactive discussion can help identify concurrent use of herbal and conventional therapies reduce the risk of potential herb–drug interactions, and support safer, more informed treatment decisions [1].

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Improved communication between patients and healthcare providers may also enhance trust and adherence, as patients are more likely to follow guidance when their cultural beliefs and treatment preferences are acknowledged [9]. Integrative care models that encourage collaboration between allopathic practitioners and trained professionals from traditional systems of medicine, such as Ayurveda and naturopathy, may offer a practical approach to incorporating evidence-informed herbal therapies into diabetes care. Such models can help ensure that alternative therapies are used appropriately, safely, and in alignment with established clinical monitoring practices.

From a broader health systems perspective, access to healthcare services remains a persistent challenge in many regions, particularly in low- and middle-income settings. In these contexts, communities often rely on a combination of conventional and traditional medical practices to meet their healthcare needs [12]. Recognizing and supporting safe traditional practices may help bridge gaps in access to diabetes care, especially where affordability and availability of long-term pharmacological treatment are limited.

From a policy standpoint, a key implication of this research is the urgent need for stronger regulation of herbal products. Concerns related to inconsistent dosing, variable composition, and product quality were highlighted by a substantial proportion of participants in this study. Strengthening regulatory oversight through national traditional medicine authorities could improve standardization, quality assurance, and labeling of herbal products, thereby enhancing patient safety and public confidence [12]. Clear regulatory frameworks would also assist healthcare providers in offering evidence-based guidance regarding the use of herbal therapies.

Public health programs should additionally prioritize patient education as a core component of diabetes management strategies. Providing accurate information about the appropriate use, potential benefits, and limitations of herbal medicines can empower individuals with diabetes to make informed choices and avoid unsafe practices. Given the affordability, cultural acceptance, and widespread use of herbal interventions, their potential role as supportive components in community-based diabetes prevention and control programs should not be overlooked, provided their use is guided by evidence and appropriate professional supervision [13].

LIMITATIONS

Although this research offers valuable findings concerning patient beliefs and outcomes related to the use of herbal medicines, there are some limitations of this research that should be acknowledged.

Firstly, a randomized control group that receives standard care only was not part of this study design. Thus, any causal relationships associated with improvements in glycemic endpoints in those using herbal medicine remain uncertain as it could be due to confounding lifestyle changes and/or standard therapies.

Secondly, the collection of the herbal usage information through self-reports may lead to

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biases in recall and reporting errors. The respondents may have had varying perceptions of the levels taken, how long they had been taken, or the form in which they had been administered.

Third, there was a lack of consistency in the herbs and their combinations used by the study subjects to permit an assessment of their impact. Also, the differences in preparation techniques and product quality could have affected both efficacy and patient perception.

Finally, the follow-up period of 12 weeks, although appropriate for evaluation of short-term glycemic control, does not include long-term endpoints such as sustained glycemic control, diabetic complication, and safety.

CONCLUSION

This paper shows that the use of herbal medicine by adults with type 2 diabetes mellitus in India is widespread and well-received. The study shows that the individuals participating in the study are satisfied and confident that the herbal form of the medicine is safe and effective and that its affordability and usefulness are satisfactory for the management of type 2 diabetes mellitus.

However, there are also concerns related to dosage transparency, quality of products, and regulation of the industry that indicates certain knowledge gaps that need to be filled.

To effectively and safely incorporate herbal medicines into the management of diabetes, there need to be certain standards in place. This will enable a holistic approach to managing diabetes in a manner that is culture-sensitive.

RECOMMANDATIONS

Based on the above findings of this study, here are the recommendations from the researcher:

1. Regularly evaluate and record patients' usage of alternative medicines like herbal supplements during consultations to facilitate safe and informed management of diabetes.
2. They can provide open communication between health practitioners and patients, hence decreasing the chances of herb/drug interactions.
3. Include information and education regarding commonly used herbs for diabetic control, their advantages, and their safety aspects within educational updates for medical practitioners.
4. Make standardized clinical practice guidelines for the use of herbal drugs as adjuvant therapy for optimal dosage, duration, and monitoring.
5. Stimulate collaboration between modern practitioners of healthcare and the practices of traditional medicine, in order to facilitate the development of more cultural and sensitive approaches in the use of herbal products.
6. Improve regulatory control in ensuring quality, standardization, and uniformity of herbal products using adequate cultivation, processing, packaging, and labeling.

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7. Use clear labeling on herbal products regarding ingredients, dosages, and cautions to boost patient confidence.
8. Implement patient education programs within public health initiatives to encourage responsible and guided usage of herbal medicines. 9. Look at evidence-based herbal therapies as complementary tools in a community-focused approach to diabetes care.

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