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Review Article

Public Health Section

Harnessing the Power of *Ayurveda* for Diabetes Management: A Narrative Review

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ABSTRACT

Ayurveda, an age-old medical tradition originating from India, provides a comprehensive method for addressing diabetes mellitus. Diabetes, marked by increased blood sugar levels, is a persistent metabolic condition posing a widespread health challenge worldwide. *Ayurveda*, drawing upon principles of balance and individualised treatment, addresses diabetes through a multifaceted lens. In *Ayurveda*, diabetes is classified under the term "*Madhumeha*," where an imbalance in the body's *doshas* (*Vata*, *Pitta*, and *Kapha*) disrupts the normal functioning of the pancreas and impairs insulin production. The approach to diabetes management in *Ayurveda* involves a personalised assessment of an individual's constitution (*Prakriti*) and the identification of imbalances (*Vikriti*). Lifestyle modifications, dietary changes, herbal supplements, and therapeutic practices like yoga and meditation are integral components of *Ayurvedic* interventions. Plants like bitter melon (*Momordica charantia*), fenugreek (*Trigonella foenum*-graecum), and *turmeric* (*Curcuma longa*) are essential components in *Ayurvedic* remedies designed to address diabetes. These herbs are believed to have hypoglycaemic properties, helping regulate blood sugar levels. Additionally, practices like *Panchakarma*, a detoxification process, are employed to eliminate toxins and restore balance in the body. *Ayurveda* emphasises the importance of maintaining a sattvic (balanced) lifestyle, incorporating mindful eating habits, regular exercise, and stress management. While *Ayurvedic* interventions for diabetes have shown promise, it is essential to consult qualified practitioners to ensure personalised and safe approaches. As the global burden of diabetes continues to rise, exploring complementary strategies like *Ayurveda* provides a holistic perspective on diabetes management that aligns with the principles of balance and wellbeing.

Keywords: Diabetes mellitus type 1, Diet, Glucose intolerance, Prevention and control

INTRODUCTION

Diabetes mellitus is a widespread ailment affecting both developed and developing nations. This chronic condition pertains to the metabolism of carbohydrates, characterised by elevated blood sugar levels (hyperglycaemia) and the detection of sugar in the urine (glycosuria). The root cause of diabetes lies in the insufficient production or utilisation of insulin, a hormone crucial for regulating blood sugar levels. This metabolic disorder poses a significant health challenge globally, as it disrupts the body's ability to effectively manage glucose, leading to a range of complications. The imbalance in insulin dynamics contributes to the persistent elevation of blood sugar, underscoring the intricate interplay between physiological factors involved in maintaining glucose homeostasis. The prevalence of diabetes underscores the pressing need for effective management strategies and emphasises the importance of ongoing research to better understand the intricacies of this complex metabolic condition [1].

In the realm of *Ayurveda*, diabetes finds its counterpart in a condition known as '*Madhumeha*.' *Ayurvedic* perspectives highlight striking similarities in the causative factors, clinical manifestations, and complications between Diabetes Mellitus and *Madhumeha*. Both conditions share commonalities in their origin and expression, underscoring the parallel observations made by *Ayurveda* in understanding these metabolic disorders. The recognition of comparable features in terms of causation, clinical presentation, and potential complications reinforces the *Ayurvedic* viewpoint that perceives these conditions through a lens of shared characteristics and interconnected physiological disruptions [2].

The root causes of diabetes mellitus remain uncertain, and the condition is thought to be influenced by various factors. Genetic predisposition, viral infections, and lifestyle choices such as excessive eating, particularly when coupled with obesity and physical inactivity, are linked to the onset of diabetes mellitus. *Ayurveda* aligns with these perspectives, stating that diabetes mellitus has inherited effects and bad behaviours as aetiological causes. In *Ayurvedic* terms, the transmission of the disease is attributed to flawed paternal and maternal germinal seeds. Unhealthy activities contributing to diabetes encompass prolonged periods of excessive sleep, the use of soft cushions, prolonged consumption of curd, milk, jaggery, sugar, and fresh grain-based foods, as well as the intake of flesh from domestic and aquatic animals. Additionally, *Ayurveda* highlights the impact of using fresh rainwater and the psychological stress generated through unfulfilled sexual urges as factors contributing to the development of diabetes. These parallel insights from both conventional and *Ayurvedic* perspectives shed light on the multifaceted nature of diabetes mellitus, acknowledging a combination of genetic, lifestyle, and environmental influences in its aetiology [3-5].

As of 2014, an estimated 422 million individuals globally grapple with diabetes, and approximately 90% of these cases belong to the type-2 diabetes category. This prevalence translates to 8.3% of the adult population, affecting both women and men equally. Within the timeframe spanning 2012 to 2014, diabetes is believed to have contributed to an annual death toll ranging from 1.5 to 4.9 million [6]. The contributing factors of type-2 diabetes closely resemble the disease entities *Prameha*/*Madhumeha* in *Ayurveda*. *Sahaja Prameha* (Hereditary) and *Apathyanimittaja Prameha* (type 2 diabetes) are the two primary types of *Prameha* that are described in *Ayurvedic* scriptures. *Apathyanimittaja Prameha* bears significant similarities to contemporary notions of Type-2 Diabetes Mellitus. In light of these parallels, *Ayurveda* introduces the concept of *Sthula Pramehi*, drawing a clear correspondence to the modern understanding of obesity and its pivotal role in the development of type-two Diabetes mellitus. This correlation between *Ayurvedic* classifications and contemporary medical concepts underscores the timelessness and cross-cultural relevance of understanding diabetes and its associated factors [7].

In the realm of *Ayurveda*, the principles of *Chikitsa Siddhanta*, or treatment methodologies, are designed with the overarching goal of disrupting the *Samprapti*, or the pathophysiology, of a disease. The emphasis lies in eradicating the ailment at its root rather than merely alleviating the symptomatic manifestations. *Ayurvedic* treatment strategies prioritise a comprehensive approach that addresses the fundamental imbalances and root causes of a condition, aiming for a more profound and sustained resolution rather than superficial relief from symptoms. This approach aligns with the core philosophy of *Ayurveda*, which seeks to restore holistic balance and wellbeing by understanding and rectifying the underlying disturbances that can aid in the onset and development of illnesses. Indeed, within the framework of *Ayurveda*, the concept of *Prameha* encompasses two primary categories: *Sahaja Prameha* and *Apathyanimittaja Prameha* [8].

1. *Sahaja Prameha*: *Sahaja Prameha* refers to diabetes that has a congenital or hereditary origin. In this context, '*Sahaja*' translates to 'innate' or 'inborn.' This category underscores the genetic predisposition or hereditary factors contributing to the development of diabetes [9].
2. *Apathyanimittaja Prameha*: *Apathyanimittaja Prameha* is characterised by diabetes that arises due to inappropriate lifestyle choices and behaviours. '*Apathyanimittaja*' indicates causation due to unhealthy practices. Factors such as dietary indiscretions, sedentary habits, and other lifestyle-related choices contribute to the onset of diabetes in this category. Understanding these classifications allows *Ayurvedic* practitioners to tailor treatments and interventions based on the specific nature and causative factors of *Prameha*, providing a more personalised and effective approach to managing diabetes [8].

The two key contributing factors to the *Prameha* aetiology are a less active lifestyle and *Ahitakara Aahara*, or unwholesome food. *Ayurveda* offers more ability to treat metabolic illnesses by addressing lifestyle and nutrition issues, which are mainly responsible for *Prameha*, by adhering to certain dietary guidelines and the practices of *Dinacharya* and *Ritucharya*. *Ayurveda* has the ability to prevent *Sahaja vikara* in other ways as well, such as *Atulyagotra* marriage, which avoids marriage within the same family [9].

Prameha is a term used in *Ayurveda* to describe a group of urinary disorders, primarily focusing on conditions related to diabetes mellitus. It encompasses a range of metabolic disorders characterised by abnormal urine composition, often associated with elevated blood sugar levels. *Ayurveda* recognises *Prameha* as a complex condition with various subtypes, each influenced by different causative factors [9].

Elevated levels of glucose (blood sugar) in the body are the hallmark of diabetes, also known as diabetes mellitus, a chronic metabolic disease. The underlying reason is either inadequate production of insulin, inadequate usage of insulin, or a mix of the two. The pancreas secretes the hormone insulin, which helps cells absorb glucose and is essential for regulating blood sugar levels [10].

Diabetes manifests in various forms, but the primary distinctions lie within two major categories:

1. Type 1 Diabetes:

Cause: Occurs when the immune system unintentionally targets and destroys the pancreatic beta cells responsible for producing insulin.

Onset: Often diagnosed in childhood or adolescence.

2. Type 2 Diabetes:

Cause: Emerges when the body exhibits resistance to insulin, or when there is insufficient insulin production by the pancreas.

Onset: Usually manifests in adulthood, but there is a growing trend of diagnosis among children and adolescents [11].

Diabetes often presents itself through a range of common symptoms. Individuals with diabetes may experience frequent urination, driven by the body's attempt to eliminate excess sugar. This excessive urination can lead to increased thirst as the body strives to maintain fluid balance. The breakdown of muscle and fat tissues for energy in the absence of enough insulin may be the cause of unexplained weight loss. An inefficient utilisation of glucose by the body as a source of energy leads to increased hunger. Fatigue is a prevalent symptom, stemming from disrupted energy metabolism. Blurred vision can occur due to changes in fluid levels in the eye's lens, and slow wound healing is a consequence of impaired circulation and immune function associated with diabetes. Recognising these symptoms is crucial for early detection and effective management of diabetes [12].

Gastrointestinal-Mediated Glucose Disposal (GIGD) is Emerging as a Comprehensive Concept in Understanding how the Gut Influences Overall Glucose Metabolism

The gut plays a pivotal role in maintaining the balance of glucose throughout the entire body. Various factors influence how the gut manages glucose and the combined processes in post-meal glucose metabolism within the gut is now termed GIGD. This term is mainly used to gauge how effectively the body clears glucose through the incretin effect, which is currently recognised as the most impactful gut-related factor affecting glucose metabolism [13].

Incretin Effect and its Role in Whole Body Glucose Homeostasis

When we eat, certain cells in the lining of the gut, known as Enteroendocrine Cells (EECs), release various peptide hormones. These hormones influence the release of insulin and signals related to feeling full after eating. Among these hormones, incretins, discovered in the 1980s, have drawn significant attention in the management of diabetes. In addition to boosting insulin production, incretin hormones also affect the movement of the digestive system and play a role in the communication between the gastrointestinal tract and other organs. Their multifaceted functions make them important players in regulating various aspects of the body's response to food [13].

Ayurvedic experts customise diet, physical activity, and daily habits, along with recommending specific treatments, medications, and herbal remedies, to harmonise the *doshas* and enhance overall wellbeing in individuals. The main remedies in *Ayurveda* predominantly come from plants, although substances sourced from metals, minerals, marine life, and animals may also be incorporated [14]. At present, the Indian government oversees the entire process of formulating policies, fostering development, and executing *Ayurvedic* programs [15]. In the late 1970s, the World Health Organisation (WHO) started recognising the advantages of traditional medicines, contributing to the increased worldwide recognition of *Ayurveda* [16]. The available evidence supporting the efficacy of *Ayurveda* in treating diabetes mellitus is restricted. However, there are numerous accounts of certain herbal combinations, including *Ayurvedic* medicines, demonstrating glucose-lowering effects without any reported adverse events [14].

PATHOPHYSIOLOGY OF DIABETES MELLITUS

Oxidative stress, caused by an imbalance between the effectiveness of enzymatic or nonenzymatic antioxidants and the generation of Reactive Oxygen Species (ROS), is the main factor in the development of diabetes. Both nonradical species like hydrogen peroxide and free radicals including superoxide, hydroxyl, peroxyl, and hydroperoxyl are considered ROS. The damaging effects of ROS are offset by antioxidants such as glutathione reductase, superoxide dismutase, carotenoids, trace minerals, as well as vitamins A, C, and E. Oxidation of low-density lipoprotein cholesterol occurs when ROS are present, causing it to be absorbed by scavenger cell receptors to form foam cells and plaques associated with arterial sclerosis. These ROS have the ability to trigger several harmful processes

essential for the advancement of diabetes, including the sorbitol aldose reductase route, electron transport chain, protein kinase C activation, and glucosamine pathway. Atherosclerosis, the creation of Advanced Glycation End products (AGEs) by lipid peroxidation, amylin buildup, and the impairment of pancreatic β-cell function can all result from the activation of these pathways. Certainly! Nrf2, a specific DNA-binding factor, and its counterpart Keap1 play crucial roles in safeguarding cells against oxidative stress [17].

Charaka extensively details the underlying progression of *Prameha* in the *Nidana sthana* (Ca. Ni. 4/8). Despite *Prameha* being categorised as a *Tridosika* disease, its onset is initially marked by the disturbance of *Kapha Dosa*. Prolonged and excessive consumption of *Kapha*-aggravating diet and lifestyle practices result in the imbalance of *Kapha*. The vitiated *Kapha*, referred to as *Bahudrava Kapha*, shares fundamental similarities with *Meda* (fat tissue). These elements interact and circulate alongside loose *Medas* throughout the body. As the condition advances, the vitiated *Kapha* engages with *Mamsa* (muscle tissue) and *Kleda* (mucus), leading to the formation of *Prameha Pidika* with *Mamsa* and the conversion of *Kleda* into *Mutra* (urine). The amalgamation of vitiated *Meda* and *Kleda* obstructs the openings of the *Mutravaha Srotas* (urinary channels). This obstruction persists for a considerable duration, ultimately resulting in the manifestation of *Kaphaja* type of *Prameha* [18].

Evolution of Diabetes Epidemiology: Shifting Patterns and Trends

Diabetes Mellitus (DM) was first recognised by the ancient Indian physicians Charaka and *Sushruta* (600–400 BC). They called it *Madhumeha*, which was characterised by excessively sweet urine. With astuteness, they observed how symptoms varied among patients, noting that some were skinny with severe polyuria, thirst, and dehydration, while others were stout, ate a lot, and did not exercise [19]. These differences eventually led to the classification of diabetes as insulin-dependent (type 1) and noninsulin-dependent (type 2), respectively. The development of uniform diagnostic and categorisation standards has greatly improved the ability to compare diabetes data globally [20]. The standardisation of diagnostic and categorisation criteria has not only made it easier to estimate the prevalence of diabetes worldwide but has also been essential for future forecasts [21-23].

Long-term Effects of Diabetes

The financial impact of diabetes arises from the ongoing management of individuals with the condition, and the costs significantly increase when vascular complications arise. Unfortunately, there is a shortage of population-based information on the occurrence of both small-scale (microvascular) and large-scale (macrovascular) complications in various regions of the developing world. It has been observed that about 30% of individuals with type 2 diabetes experience retinopathy, with its prevalence being particularly notable in Asian and Pacific Island nations [24]. Research conducted in southern India found that 34.1% of individuals surveyed had diabetic retinopathy [25]. India has recorded elevated occurrences of Cardiovascular Disease (CVD) [26,27]. Similarly, high rates of CVD have been observed not only in other Asian nations but also among Indian migrant populations [28]. In Chennai, data reveals the occurrence of complications in type 2 diabetes, with the following prevalence rates: retinopathy at 23.7%, nephropathy at 5.5%, peripheral neuropathy at 27.5%, CVD at 11.4%, peripheral vascular disease at 4.0%, and stroke at 0.9%. Additionally, there is a high prevalence of hypertension, standing at 38.0%. The occurrence of coronary heart disease among Indians might be equally elevated, comparable to the rates observed in immigrant Indian populations [29]. It was observed that approximately 84% of patients admitted with acute coronary syndrome exhibited abnormal glucose tolerance. In comparison to the Caucasian population, Asian Indians have a lower prevalence of peripheral vascular disease (9.3%). Despite the lower prevalence of peripheral vascular disease, neuropathy is highly prevalent and serves as a contributing risk factor for recurrent foot infections [30,31].

Prevention of Diabetes

India needs to implement proactive measures to ease the impact of diabetes, as the current financial allocations for diabetes care do not adequately address the significant healthcare challenge it poses. The onset of diabetes arises from an intricate interaction of genetic and environmental elements. While the genetic aspect remains immutable, numerous environmental factors can be altered. Elements like obesity, dietary preferences, and physical activity belong to the group of risk factors that can be changed or influenced. The way diet and exercise interact plays a crucial role in shaping the distribution of body fat and significantly impacts insulin sensitivity. Adopting traditional lifestyles characterised by a diet low in saturated fat and rich in complex carbohydrates, coupled with increased physical activity, may serve as protective measures against the emergence of cardiovascular risk factors and diabetes. This remains valid even when there is a potential genetic inclination [32].

ACCORDING TO *AYURVEDA* MANAGEMENT OF DIABETES

Ancient Indian physicians were familiar with diabetes mellitus (*Madhumeha*), and *Ayurvedic* texts provide a detailed account of its clinical features and management. *Ayurvedic* practitioners employ a comprehensive approach to address diabetes, incorporating diet adjustments, *Panchkarma* for system cleansing, herbal formulations, yoga, and breathing exercises [33]. Various plants, such as *shilajit*, *turmeric*, *neem*, *Coccinia indica*, *amla*, *triphala*, bitter gourd, rose apples, bael leaves, cinnamon, gymnema, fenugreek, bay leaves, and aloe vera, are employed for managing diabetes [34].

Plants Used for Diabetes

Abrus precatorius (Fabaceae)- Gunja [35]

The leaves of *A. precatorius* are crushed, and the juice obtained is separated. After allowing this juice to settle for four to five hours, the sediment is collected. A dose of 10 grams of this sediment is mixed with bee's honey and given to individuals with diabetes.

Acacia arabica (Fabaceae)- Babbula [36]

A decoction is made using 60 grams of dried stem bark from *A. arabica*, and a 120 mL portion of this preparation is consumed twice daily.

Acacia chundra (Fabaceae) – Khadira [37]

A decoction is created using 60 grams of dried stem bark obtained from *A. chundra*, and a 120 mL portion of this concoction is administered twice daily.

Achyranthes aspera (Amaranthaceae) – Apamarga [37]

A decoction is crafted using 60 grams of dried entire plant material from *A. aspera*, and a 120 mL dosage of this preparation is administered twice a day.

Alternanthera sessilis (Amaranthaceae) – Matsyakshi [36]

The *A. sessilis* plant, weighing 50 grams, is chopped into small pieces and crushed thoroughly. Following this, 100 mL of water is added to extract the juice, which is then ingested. The upper part of the plant is finely chopped and mixed with scraped coconut, salt, and *turmeric* powder. The blend is heated in a pan until cooked and is subsequently consumed with rice.

Anethum graveolens (Apiaceae) – Satapushpa [38]

The dried seeds of *A. graveolans* are grounded into a powder, and a 10-gram portion of this powder is administered twice daily.

Chikitsa Sutra (Principles of Treatment) [39]

In cases of *Pramehas*, *Kapha* experiences imbalances across all types, but in *Madhumeha*, there is a notable tendency for *Vata* to

be exacerbated as well. Consequently, treatment strategies aim to address both *Kapha* and *Vata* concurrently. According to *Charaka*, individuals with obesity and a robust physique are advised to undergo *Samsodhana* treatment, which focuses on purification. Conversely, those with a lean and weak body structure are recommended to opt for *Brihmana* therapy, emphasising nourishment and strengthening. *Sushruta* suggests that individuals with emaciated or underweight *Pramehi* conditions should undergo treatment involving nourishing measures, including a processed diet and specific drinks. In contrast, for those who are obese, the recommended approach involves measures aimed at reducing excess, such as exercise (*Vyayama*) and purification (*shodhana*).

Ausadhi **(medicines):** It is evident that *Kapha Dosha* plays a significant role in *Prameha*, and the corrupted fat tissue (*Dusya Meda*) shares a similar nature. In *Ayurveda*, the recommended treatment for *Prameha* involves the use of drugs with *Tikta* (bitter), *Katu* (pungent), and *Kashaya* (astringent) tastes. *Susruta* specifically highlights the use of a decoction containing drugs from the *Salasaradi Gana* category along with *Shilajatu* for the effective treatment of "*Prameha*/*Madhumeha*" [40].

Ahara **(diet):** The primary emphasis in disease management, as strongly advocated in various medical texts, is "*Nidana Parivarjana*," which involves avoiding the causative factors of the ailment. For *Prameha*, it is advised to adopt a diet that does not contribute to weight gain and opposes the factors leading to the condition. Considering that diabetes is closely associated with a modified lifestyle and impaired digestive fire (*Agni*), special attention should be given to dietary choices and purificatory measures. *Charaka* recommends *Yava* (barley) and similar grains as the principal diet for individuals with *Prameha*. He proposes an interesting method where *Yava* is initially fed to animals, and the remaining parts collected from the dung of these animals are then consumed by those dealing with *Prameha*. This approach is aimed at ensuring the suitability of the diet for managing the condition [40].

Vihara **(exercise and yoga):** As previously noted, the absence of physical activity and excessive daytime and night-time sleep significantly contribute to the onset and progression of *Prameha*. In the advanced stages of *Prameha*, *Sushruta* recommends incorporating regular physical exercise into the lifestyle of those dealing with the condition. This includes engaging in activities such as wrestling, participating in sports, horseback or elephant riding, extended walks, pedestrian journeys, archery practice, and javelin casting. These activities are advised as beneficial measures for individuals in the advanced stages of *Prameha* [40].

DISCUSSION

Global Diabetes Challenge

Diabetes mellitus is a prevalent and chronic metabolic disorder that affects populations globally. It is characterised by elevated blood sugar levels and glycosuria. Insufficient production or utilisation of insulin, a hormone crucial for regulating blood sugar levels, is at the core of this metabolic dysfunction. Diabetes poses a significant health challenge, disrupting the body's ability to manage glucose effectively and leading to various complications. The complex interplay of physiological factors underscores the intricate nature of maintaining glucose homeostasis [41].

Madhumeha: *Ayurvedic* Perspective

In the *Ayurvedic* context, diabetes finds its counterpart in '*Madhumeha*,' where parallels in causative factors, clinical manifestations, and complications are recognised between Diabetes Mellitus and *Madhumeha*. Both systems of medicine acknowledge the shared characteristics and interconnected disruptions in physiological processes associated with these metabolic disorders.

The root causes of diabetes involve genetic predisposition, viral infections, and lifestyle choices, including excessive eating, obesity, and physical inactivity. *Ayurveda* aligns with these perspectives, attributing diabetes to hereditary influences and unhealthy behaviours. The transmission of the disease is linked to flawed paternal and maternal germinal seeds, with lifestyle factors such as prolonged sleep, the use of soft cushions, and specific dietary choices contributing to its onset [42].

The global prevalence of diabetes emphasises the urgency for effective management strategies and ongoing research to comprehend the complexities of this condition. *Ayurveda* introduces the concept of '*Prameha*,' encompassing *Sahaja Prameha* (congenital or hereditary) and *Apathyanimittaja Prameha* (due to unhealthy lifestyle choices). The latter closely aligns with the modern understanding of Type-2 Diabetes mellitus [40].

The principles of *Chikitsasidhhanta* in *Ayurveda* prioritise disrupting the pathophysiology of a disease at its root rather than merely alleviating symptoms. Two main categories of *Prameha*, *Sahaja Prameha*, and *Apathyanimittaja Prameha*, guide *Ayurvedic* practitioners in tailoring treatments based on specific causative factors [43].

Ayurvedic Perspectives on Public Health and Disease Prevention

Epidemiological data underscores the changing trends in diabetes, with approximately 387 million individuals affected globally, primarily by Type-2 Diabetes. Chronic complications, both microvascular and macrovascular, contribute to the financial burden of diabetes care, necessitating preventive measures [44].

Prevention strategies in *Ayurveda* focus on modifying modifiable risk factors, such as obesity, dietary choices, and physical activity. The interplay between diet and exercise plays a crucial role in shaping body fat distribution, impacting insulin sensitivity.

Ayurvedic management of diabetes involves a triangular approach–*Ahara* (Diet), *Vihara* (Exercise and Yoga), and *Ausadhi* (Medicines). Medicines include herbal formulations like *Shilajatu*, *turmeric*, *neem*, and specific *Ayurvedic* preparations. Dietary recommendations in *Ayurveda* suggest a diet that opposes the factors leading to diabetes, incorporating grains like *Yava*. Exercise and physical activities are emphasised, aligning with the *Ayurvedic* prescription for those dealing with diabetes [45].

In summary, the integration of *Ayurvedic* principles into the understanding and management of diabetes provides a holistic approach, addressing the multifaceted nature of this metabolic disorder. The timeless wisdom of *Ayurveda* offers valuable insights that complement contemporary medical perspectives, paving the way for a more comprehensive and personalised approach to diabetes care.

CONCLUSION(S)

In conclusion, diabetes mellitus presents a significant global health challenge characterised by elevated blood sugar levels and disruptions in insulin regulation, showcasing the intricate balance required for glucose homeostasis. *Ayurveda's* recognition of '*Madhumeha*' as diabetes counterpart underscores shared aetiological and clinical features, bridging traditional and modern medical perspectives. Root causes of diabetes, including genetic predisposition and lifestyle factors, resonate with *Ayurvedic* principles, emphasising the need for comprehensive management strategies and ongoing research efforts. *Ayurveda's* classification of '*Prameha*' parallels modern Type-2 Diabetes classification, highlighting the relevance of *Ayurvedic* insights in contemporary medicine. *Ayurvedic* management focuses on addressing root causes through personalised approaches, integrating diet, exercise, and herbal formulations to foster sustained resolution. Emphasising preventive measures, *Ayurveda* advocates for lifestyle modifications, aligning with the interplay between diet, exercise, and insulin sensitivity. Overall, the integration of *Ayurvedic* principles

enriches diabetes care, offering a holistic and personalised approach to improving well-being and the quality of life for affected individuals.

Disclaimer: This paper is being published to highlight the ancient understanding of human physiology. However, readers are cautioned that the medicine has advanced with better methods of treatment and more evolved understanding.

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