

AN TRADITIONAL AND INTEGRATIVE APPROACH FOR DIABETES
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ABSTRACT

The holistic disease management principles of Ayurveda, the Indian system of medicine, can play a pivotal role in this context. This narrative review discusses the scope of a trans-disciplinary 'Ayurveda-Biology' approach for deepening the holistic understanding of the pathophysiology of diabetes as well as designing novel integrative strategies for managing diabetes and restoring whole body glucose homeostasis. Therefore, a holistic and systemic approach is essential for its successful management. We hypothesize an integrative diabetes management strategy, combining holistic principles of diabetes management with its molecular understandings. Diabetes is a multifactorial disease with complex multi-organ-multi-target crosstalk in the body. Currently, the theoretical assumptions framing the diabetes management strategies are reductionist and largely focus on reducing hyperglycemia through targeted molecular drugs. While they effectively reduce hyperglycemia, they are inadequate to address the multifactorial etiopathology, chronicity and systemic complications of diabetes.

KEYWORDS: Ayurveda-Biology, Samhita siddhant, Diabetes management, Integrated Health.**INTRODUCTION**

An appropriate and effective merger of both holistic and reductionist views is imperative for successful health and disease management. This is the context where integrative medicine or medical pluralism becomes relevant. Its aim is to recognise and logically bridge epistemologically and culturally different perspectives of health and disease management. It neither rejects nor accepts one system; but mutually integrates positives from systems. Although pluralism in medicine is criticised for multiple reasons, the notion of integrative medicine is becoming more popular in the contemporary healthcare sector, particularly in the management of chronic lifestyle diseases. The need of the hour is a paradigm shift in the perspective of diabetes management, from reductionist to holistic, which can target multiple organ systems involved in glucose homeostasis and pathophysiology of diabetes. Holistic perspective and principles on wellness and disease management practiced in *Ayurveda* may be a worthwhile option in this context. We hypothesize, a trans-disciplinary framework of medical pluralism built on pragmatic acculturation of holistic concepts of *Ayurveda* and molecular insights of modern biomedicine would be the prerogative for designing novel integrative strategies for diabetes management.

Contemplating on a trans-disciplinary medicine approach, focusing on holistic concepts of lifestyle, wellness, diet and energy homeostasis would also generate novel insights into the multifaceted physiology and biochemistry of whole-body glucose homeostasis. This narrative review discusses the scope of an 'Ayurveda-Biology' platform for designing integrative management strategies for diabetes. Forging bridges between disciplines is the path-breaking strategy for innovation in science. Therefore, creating a trans-disciplinary knowledge framework between *Ayurveda* and modern biomedicine could be the paradigm shift in the global healthcare sector to fulfil the contemporary healthcare demands.

METHODOLOGY

The article analyses of diabetes management and correlates it with the molecular understanding of its pathophysiology and management. The sources of information used in this article include classical texts of Ayurveda, medical books, published research articles and scientific databases like PubMed, Science-Direct, etc.

DISEASE MANAGEMENT OF AYURVEDA

According to *Ayurveda*, diseases seek various causes for

their manifestation. The causes which manifest the diseases are known as *Hetu* or *Nidana*. Without *Hetu* or *Nidana*, diseases never manifest. *Doshas* get vitiated by consuming *Mithyahara* and *Vihara*, and because of *DoshaPrakopa*, the effect, i.e., diseases, are manifested. *Alleviation* of the disease is also *Karya*. *Aushadhadravayas* are the causative factors for the effect, i.e., alleviation of the diseases. By following the daily and seasonal regimen, etc., healthy regulations cause the effect, i.e., a healthy state.

Ayurveda recognizes health as a condition when the master regulators of physiology viz. *Doshas* (*Vata*, *Pitta* and *Kapha*), metabolic activities (*Agni*), structural components (*Dhathu*), excretory functions (*Mala-kriya*) as well as the psychological and behavioural contentment of an individual are in complete homeostasis and optimum function. Consequently, disease is considered as a collective systemic expression of pathological afflictions that disrupt the body's homeostasis.

DIABETES - THE AYURVEDA PERSPECTIVE

In *Ayurveda*, *PramehaVyadhi* is a group of urinary disorders characterized by abnormal and excessive urination. It is caused by imbalances in the *Vata*, *Pitta*, and *Kapha* doshas. There are different types of *Prameha* based on the dominant dosha involved.

- *Kaphaja Prameha*: Imbalance in *Kapha*, leading to white, cloudy urine and heaviness in the body.
- *Pittaja Prameha*: Imbalance in *Pitta*, causing yellowish or reddish urine, burning sensation, and increased thirst.
- *Vataja Prameha*: Imbalance in *Vata*, leading to frequent urination, dark and scanty urine, and weakness.

When the *Agni* homeostasis in gastro-intestinal tract (GIT) gets perturbed by various etiological factors like genetics, lifestyle issues and unwholesome diet. *Prameha* and *Madhumeha* are the two diabetes-equivalent clinical manifestations described in *Ayurveda*. *Prameha* is a broad group of disorders characterised by excess and turbid urination, with symptomatic similarities to the pre-diabetes stage. Prolonged existence of *Prameha*.

GUT-CENTRIC VIEW OF PATHOPHYSIOLOGY AND MANAGEMENT OF DIABETES IN AYURVEDA

Ayurveda has a gut-centric and systemic view of describing the pathophysiology and management of diabetes. Three unique concepts of *Ayurveda* viz. *Agni*, *Ama* and *Rasa-dhathu* are central in understanding the pathophysiology of *Prameha*. *Agni* is a physiological phenomenon that optimises the metabolic transformations in the body by regulating digestion, absorption and bio-assimilation of nutrients from ingested food. The strength and homeostasis of *Agni* is critical in determining overall health of an.

ROLE OF GUT IN HOLISTIC MANAGEMENT OF DIABETES

The gut or GIT is the first anatomic site that interfaces the ingested food (primary source of glucose and energy) and body's metabolic homeostasis. It is the largest endocrine organ that regulates nutrient absorption and energy homeostasis of the body. The gut harbours a variety of cells especially in the small intestine, with receptors responding to various nutritional cues, and secretes hormones and nutrient metabolizing enzymes to crosstalk with major physiological systems like the liver.

INCRETIN EFFECT AND ITS ROLE IN WHOLE BODY GLUCOSE HOMEOSTASIS

In response to the ingested food, enteroendocrine cells (EECs) present in the gut epithelium secrete several peptide hormones which modulate insulin release and food satiety signals. Of these, incretin hormones, identified in the 1980s, garnered considerable interest in diabetes management because of their pleiotropic roles in enhancing insulin secretion, gastro-intestinal motility and modulation of gastro-intestinal crosstalk with other organs (Holst et al., 1987; Moody et al., 1984).

OTHER GUT-CENTRIC ACTIONS IN GLUCOSE METABOLISM

Apart from the incretin effect, the human gut has several key functions during postprandial glucose metabolism. For example, the gut-brain axis constituting the enteric nervous system has a crucial role in regulating various gastrointestinal functions like intestinal motility, blood flow, secretion, barrier function, and interactions with immune and gut endocrine system and it is often referred as the 'second brain' (Knauf et al., 2020). A growing body of evidence confirms the gut's.

GUT AS A CONVERGING NODE FOR 'AYURVEDA-BIOLOGY' UNDERSTANDING OF DIABETES MANAGEMENT

Now the pertinent question is how can these holistic and reductionist (conventional biomedicine) principles of diabetes management be logically integrated? Do these different epistemologies intersect? The answer is, yes. It is quite interesting to note that the Complementary and Alternative Medicines (CAMs) in general and *Ayurveda* in particular, emphasize the role of gut and gut-derived factors in the body's metabolic homeostasis, wherein diet is considered to be one of the primary pillars.

CONCLUSIONS OF 'AYURVEDA-BIOLOGY' FOR DIABETES MANAGEMENT

The holistic concepts of diabetes management and the rich repository of safe and food-equivalent herbal materials attracted scientists and physicians to explore *Ayurveda* for developing novel drug candidates and holistic management strategies for diabetes and associated diseases. Review of research literature indicates that every plant mentioned in *Ayurveda* for *Prameha* management as well as some

of the anti-diabetic herbal formulations were studied for their chemistry, pharmacodynamics.

RESULTS

The principles of both Ayurveda and modern biomedicine overlap at a gut centred view of diabetes management; and Gastro-intestinal mediated glucose disposal, a holistic concept of glucose metabolism, is emerging as a converging node for designing innovative integrative diabetes management strategies. Both the systems recognize the central role of gut and gut derived factors in postprandial glucose disposal and whole body glucose homeostasis.

CONCLUSIONS

Knowledge framework integrating the patient centred holistic management principles of Ayurveda and the molecular approaches of modern biology can give better insights into the biology of whole body glucose homeostasis and offer novel strategies for cost effective, holistic and multi-targeted management of diabetes. An integrative disease management strategy, combining holistic and reductionist perspectives of traditional medicine and biology respectively, would be the prerogative for successful management of diabetes.

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