

PREVALENCE OF DIABETES: AYURVEDA AND MODERN CLINICAL THEORY**Dr. Sanjeev M. Khuje*¹, Dr. Shashank Jha², Dr. Praveen Raghuwanshi³ and Dr. Devasya Pratap Singh⁴**¹HOD, Department of Roga Nidana and Vikriti Vigyan, Government (Autonomous) Ayurveda College, Rewa, Madhya Pradesh.²PhD Scholar, Department of Kayachikitsa, Government (Autonomous) Ayurveda College, Rewa, Madhya Pradesh.³Ayurveda Medical Officer, District Hospital, Chhindwara.⁴Assistant Professor, College of Pharmacy, Awadhesh Pratap Singh University, Rewa Madhya Pradesh.***Corresponding Author: Dr. Sanjeev M. Khuje**

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ABSTRACT

Diabetes, also known as Diabetes Complex, has emerged as a significant global health concern. According to the 2019 study report by the Indian Council of Medical Research presented to the Government of India, the prevalence of this epidemic is highest in North East Asia, particularly in India, where the number of diagnosed cases is approximately 70 million. Additionally, an estimated 80 million individuals are in a pre-diabetic state. Diabetes, a global problem, has been detailed in ancient Indian scriptures, such as the Sakya Vedas and various Ayurvedic scriptures such as Sakkara Samhita, Sushruta Samhita, Madhva Siddha, AshtangaHridaya, Ashtanga Samgraha etc. Diabetes is discussed in Vedic literature especially in "Kausika Sutra" of "Arthavaveda". The etiology of diabetes has also been studied by Ayurvedic authors in the context of description and remedial measures. Diet, exercise, and lifestyle modifications play crucial roles in the effective management of type 2 diabetes, all of which are extensively outlined in Ayurveda, the ancient Indian medical tradition. The Ayurvedic approach to treating type 2 diabetes primarily involves the use of herbs, complemented by exercise, weight management strategies, and various ancillary procedures. Modern medical practices have incorporated the hemoglobin A1C (HbA1C) value as a significant metric. In contrast, Ayurveda evaluates the functioning of an individual, emphasizing the establishment of equilibrium among the life forces, or doshas, inherent in every person. Through the present article, the authors have attempted to explain the prevalence of Diabetes (Diabetes Complex) as well as its management through the Indian traditional medical practice Ayurveda and the modern medical principles currently prevalent and recognized all over the world. The intention is to provide substantial benefit to individuals afflicted with diabetes.

KEYWORDS: Diabetes, Madhumeha, Prameha,**INTRODUCTION**

The first actual description of diabetes was made back in 1500 BC. India's famous medical scholars *Sushruta* (400 BC), *Agnivesha* (1000 BC) and *Charaka* (6 AD) have described many symptoms and types of diabetes. However, the Indian name for diabetes, "*madhumeha*" or "sweet urine", came into use after the 6th century BC, with the Latin word "melitus" (*madhu*) being applied much later.

Diabetes is a genetic disease, which arises from insufficient insulin production by the pancreas or the body not being able to effectively utilize the available insulin. Insulin is a hormone that supports biological energy by regulating our blood sugar. Failure to convert sugar into energy results in elevated blood sugar levels. High levels of sugar in the blood over a long period of

time cause damage to many organs of the body, causing heart attack, brain stroke, nerve damage, anal disease, blindness, impotence and infections, etc. Due to non-healing of wounds in diabetic patients, the situation reaches the point of amputation. Diabetes is considered a silent killer, by the time its symptoms become visible, the person's condition would have deteriorated.

There are two main types of diabetes.

(1) **Diabetes Type-1** – This type of diabetes usually occurs in children and young people but it can affect individuals of all ages. This variation of diabetes is characterized by the autoimmune destruction of insulin-secreting cells in the body, leading to the cessation of insulin production by the pancreas. Subsequently, individuals afflicted with type 1 diabetes require lifelong insulin administration, typically through regular

injections. This form of diabetes is observed in approximately 10 percent of the population.

(2) Diabetes Type-2 – In type 2 diabetes, the body produces insufficient insulin or fails to effectively utilize the available insulin. Individuals with type 2 diabetes often have obesity and lead sedentary lifestyles. This condition is primarily attributed to lifestyle factors such as obesity and physical inactivity, with approximately 90% of patients experiencing this disease due to these factors.

DEFINITION OF DIABETES

Diabetes, often referred to as diabetes mellitus, is a group of complex metabolic diseases characterized by elevated blood glucose levels due to insufficient insulin production, inadequate response of body cells to insulin, or both. The primary symptom of diabetes is polyuria or cloudy urine (*Prabhuta Avila Mutrata*), with glycosuria (*MutreAbhidawantiPipilikashch*) being the most prevalent indication. If the level of glucose in the body is elevated than the normal level, glucose can also be detected by urine test.

According to Ayurveda, diabetes can develop in two ways

1. *Dhatukshaya*: Deficiency of *Dhatu*s or tissues in the body.
2. *Avarana*: Obstruction of pathways or channels in the body.

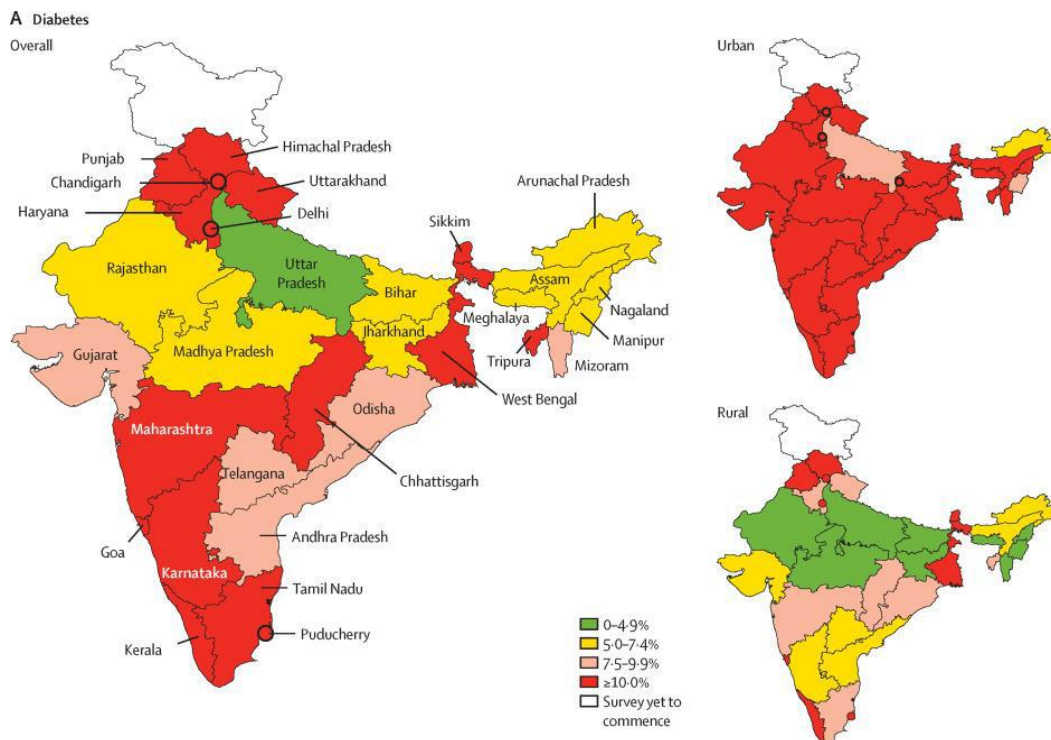
Blockage of the channels can be caused by clogged *Kapha dosha* or other tissues such as tendons or muscles. This may be the cause of diabetes that occurs with age. *Dhatukshaya* is a primary symptoms of diabetes in which there is depletion of tissues. “*Ojas*” is the basis of life (it

is the essence of all *Dhatu*s that provides strength to the body, mind and soul). *Ojas* helps in the analysis of physical, emotional, sensory and other functions. This is an invaluable basis of life which gets eliminated from the body due to urine secretion in diabetes (hence *Madhumeha* is also called *Ojomeha*). *Dhatukshaya* means deficiency of *Dhatu*s or tissues in the body and *Avarana* means obstruction of the pathways or channels available in the body.

SEVERITY AND PREVALENCE OF DIABETES IN INDIA AND GLOBALLY

Diabetes, a non-reversible chronic condition, has now become a common disease in the general population. Currently, this disease is the leading cause of death and morbidity in India and globally, due to which the cost of treatment is continuously increasing globally. In 2021, there were 6.7 million deaths reported globally due to diabetes and its related diseases. According to an estimate by the International Diabetes Federation (IDF), about 537 million people worldwide were affected by diabetes in the year 2021. According to IDF if effective measures in preventing the spread of diabetes are not taken, the total cases may rise to 1.3 billion by 2050.

Currently, more than 541 million people are on the verge of developing diabetes (Pre-diabetic condition). From 1990 to 2016, diabetes-related disability (DALY) has been doubled. Currently, the prevalence of diabetes is increasing rapidly in almost all countries, but it affects people in lower and middle-income countries (LMCs) the most, who alone account for 75-80% of the total global diabetes population. (Maiti S et al., 2023; Ong KL et al., 2023).



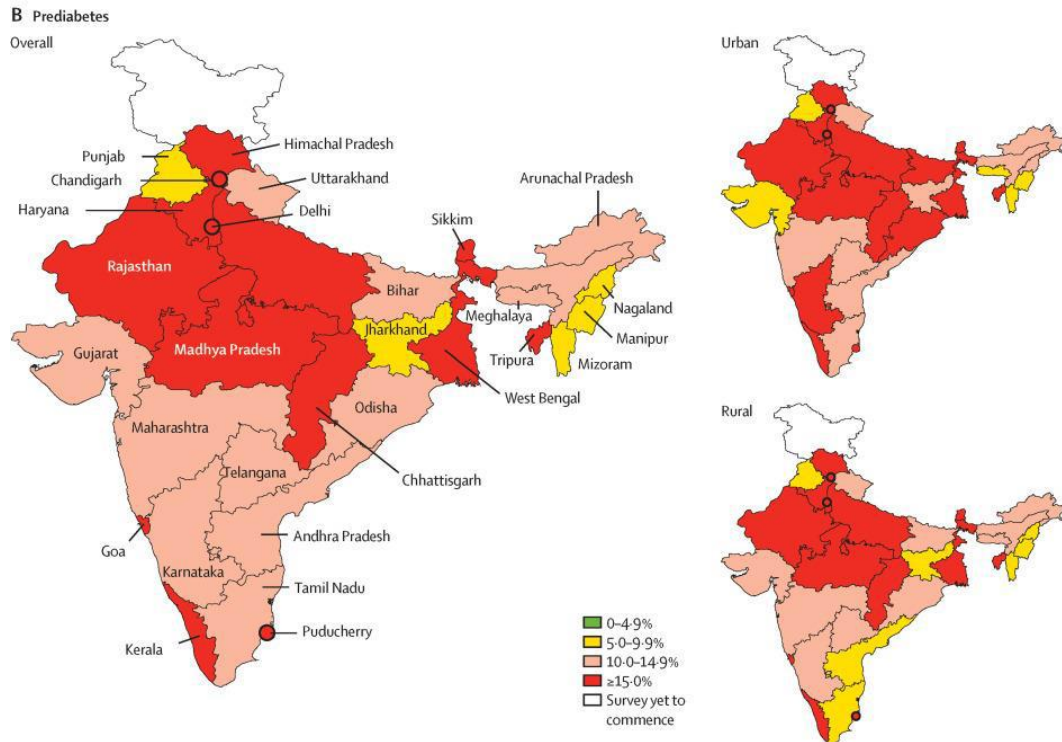
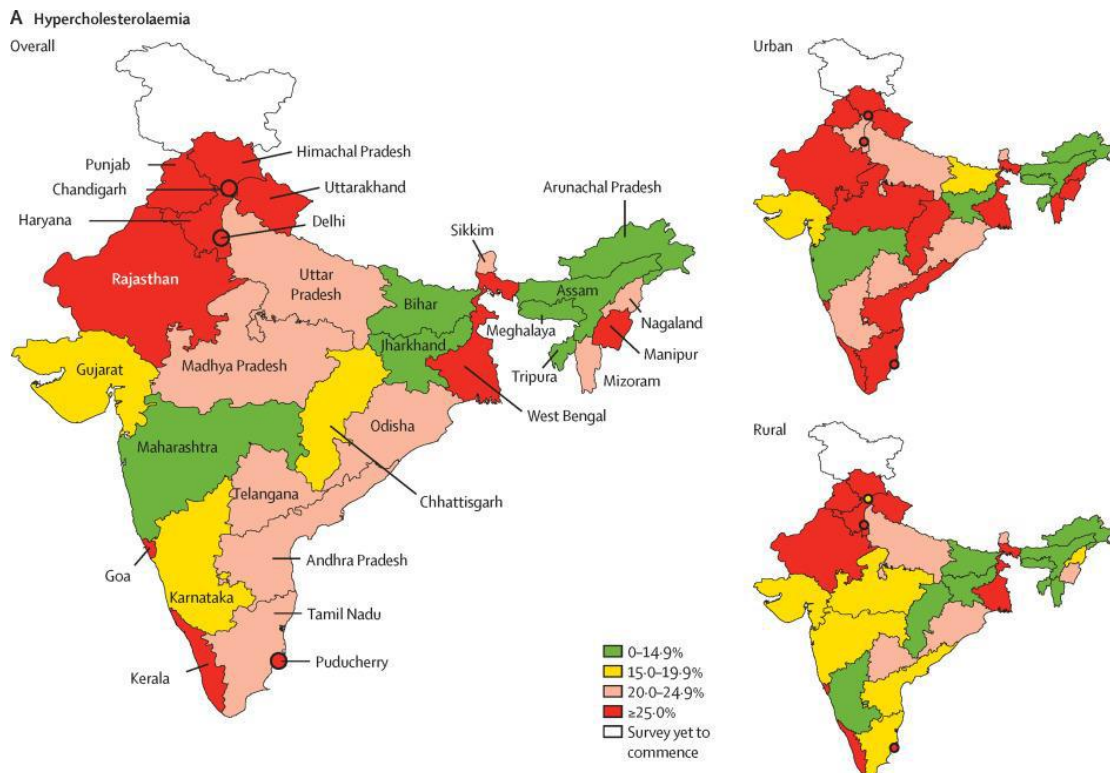


Figure 1: Overall and region-wise estimated prevalence of diabetes and pre-diabetes. (A) Diabetes. (B) Pre-diabetes. (Anjana et al., 2023).

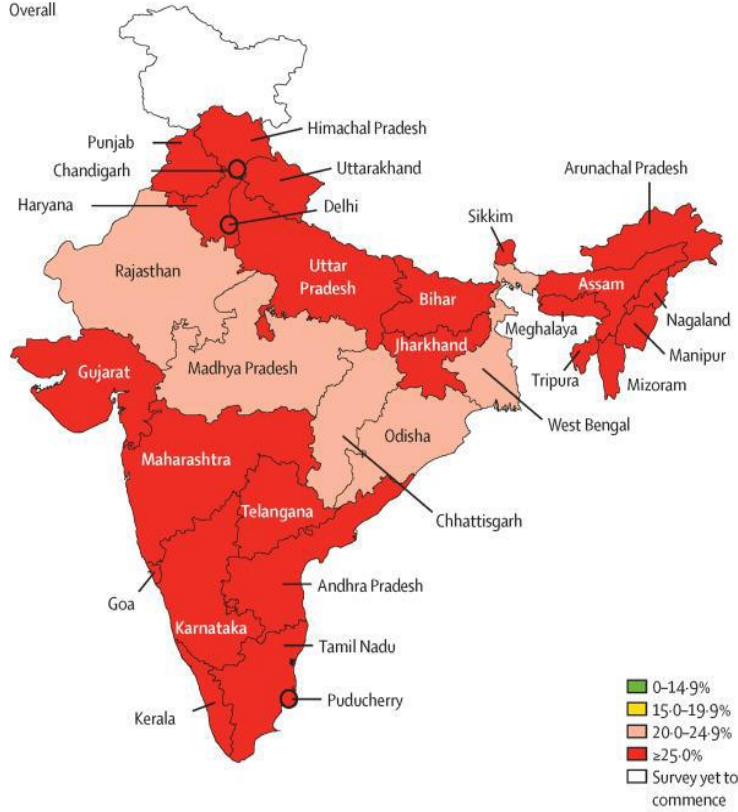
The prevalence and increase of diabetes is increasing rapidly in all countries of the world. Diabetes is now linked to almost every chronic disease. As a result, treatment of diseases has become very complex and long term. If a patient has diabetes for a long time, over time, it can lead to serious heart and eye conditions, kidney

and nerve damage, which can lead to amputations, severe vision problems, and an increased risk of premature death. The global health cost of diabetes continues to rise, estimated at USD 966 billion in 2021 and projected to rise to USD 1028 billion by 2030. (Maiti S et al., 2023)

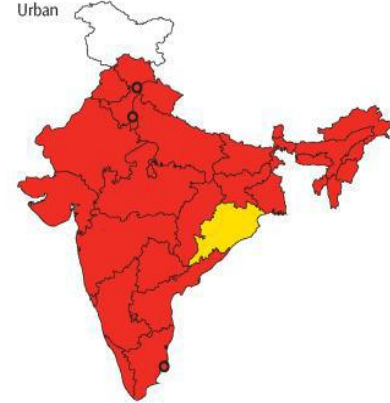


B Hypertriglyceridaemia

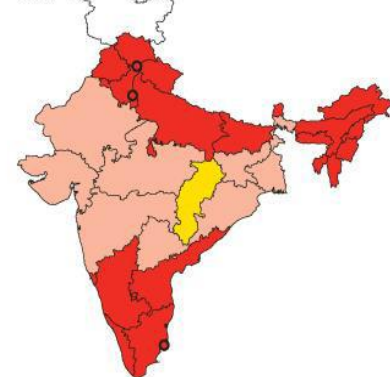
Overall



Urban

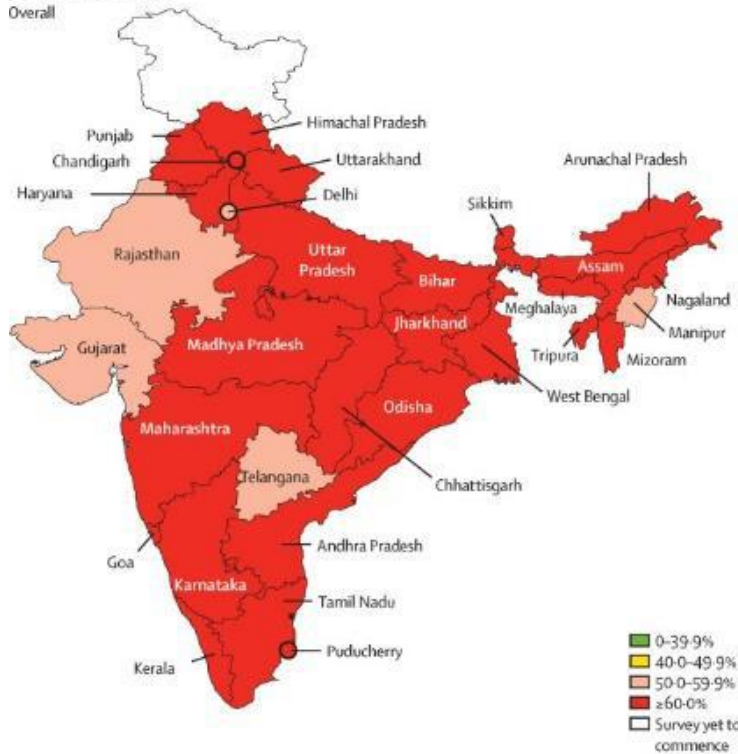


Rural



C Low HDL cholesterol

Overall



Urban



Rural



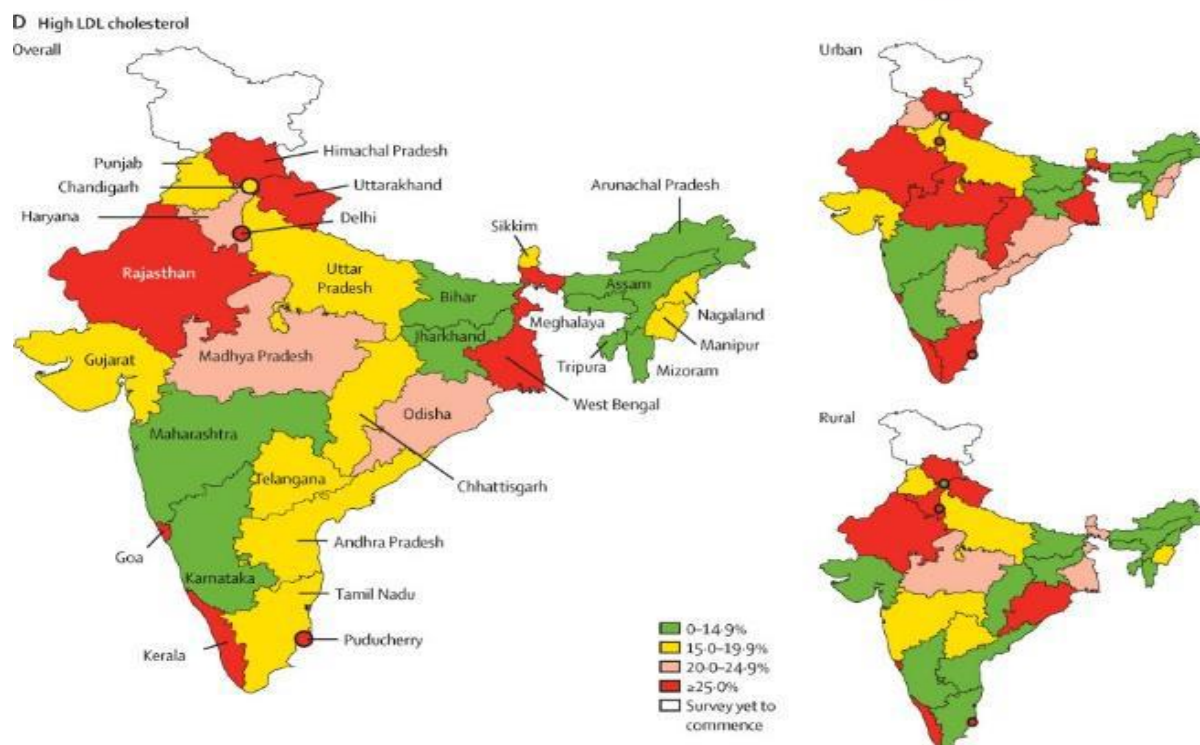


Figure 2: Overall and area-weighted prevalence of high cholesterol, high triglycerides, low HDL cholesterol, and high LDL cholesterol (A) High cholesterol. (B) High cholesterol (C) Low HDL cholesterol. (D) High LDL cholesterol (Anjana et al., 2023).

India has second highest number of diabetic patients in the world. In 2021, India has 74.9 million diabetics of the 20–79 year age group, which may rise to 124.9 million in 2045. According to IDF, one in seven adults with diabetes lives in India, and every third household has a diabetic person. In India, the prevalence of diabetes was estimated at 7.5%, based on a study of 1.3 million adults during 2012–2014. According to the Indian Council of Medical Research-India conducted a Survey Report “India Diabetes” (ICMR INDIAB)-2023, among adults aged 20 years and above in urban areas of developed states of India during 18 October 2008 to 17 December 2020. The prevalence of diabetes rose from 5.5% in 1990 to 7.7% in 2016. The National Non-Communicable Disease Monitoring Survey (NNMS) reports that the prevalence of diabetes in India was 9.3% in 2018, and the IDF estimates it to be 9.6% in 2021, which is expected to increase to 10.4% by 2030 (Maiti S et al., 2023; Anjana et al., 2023).

PRINCIPLES OF AYURVEDIC TREATMENT IN DIABETES

Ayurveda, India's more than 5,000-year-old holistic medical system, emphasizes balance and harmony between body, mind and spirit. Diabetes is known as “*Madhumeha*” or “*Prameha*” in *Ayurveda*. According to *Ayurveda*, diabetes is linked to an imbalance in the three *doshas* of the body: *Vata*, *Pitta* and *Kapha*.

Acharya Charak, while describing *Prameha* as a problem related to *Mutra* and *Basti*, defined it in more simple words and explained that ‘*Pra*’ means excessive and

‘*Meha*’ means urine, combining both of them means *Prameha* and the discharge of contaminated urine in large quantities. In *Charaka Samhita* (1500 BC), while describing *Prameha* in *Nidana Sthana* and *Chikitsa Sthana*, he has written about 20 types of it. Among those 20 types, one is the *Madhumeha* i.e. excess of sugar in the urine and *Kashaya Aviral Prabhuta Mutra* has also been mentioned. While classifying *Prameha* as serious diseases, *Acharya* said that if *Prameha* is not treated on time, then all these types of *Prameha* will convert into *Madhumeha*. Explaining the hereditary effect of this disease, he has written that it can also be passed from one generation to another.

Acharya Sushruta has provided an accurate analysis of the causes of common types of *Madhumeha* (non-insulin-diabetes mellitus). Describing this, *Sushruta* said that generally, it is more likely to happen to lazy people i.e. people who do not exercise, run or do physical activity, eat fatty foods and consume excessive junk food.

Sushruta has explained in detail about the second type of *Madhumeha* (insulin-dependent), according to him, this type of diabetes is more common in people with thin physique. The main symptoms of type 2 diabetes are loss of appetite, decreased thirst, emaciation, extreme weakness and physical weakness.

DIABETES FROM A MODERN PERSPECTIVE

Diabetes is a metabolic disorder, which is caused due to lack of secretion of a hormone called insulin in the beta

cells of the pancreas or lack of its effect leads to high blood sugar. Diabetes can be classified into the following general categories:

Type 1 Diabetes: (due to autoimmune T-cell destruction, usually resulting from complete insulin deficiency, including reversible adult autoimmune diabetes)

Type 2 Diabetes: (due to a progressively higher B-cell insulin production, usually on a background of insulin resistance)

Gestational diabetes: This occurs during pregnancy in women and usually appears in the last months of pregnancy. (Diabetes diagnosed in the second or third trimester that was not clearly evident before pregnancy).

Certain types of diabetes caused by other causes, such as, single-genetic diabetes syndromes (such as juvenile diabetes and young adulthood diabetes), chronic pancreatic diseases (such as cystic fibrosis and pancreatitis), and diabetes induced by drugs or chemicals (such as chronic glucocorticoid use, in the treatment of HIV/AIDS, or after major transplantation).

Prediabetes: This is a condition in which blood sugar levels are high, but their levels are not high enough to cause diabetes. This may usually be a sign of earlier development of diabetes.

Type 1 diabetes and type 2 diabetes also include a number of other diseases, which have been described previously. Classification of the disease is necessary for proper treatment. The traditional view is that type 2 diabetes occurs only in adults and type 1 diabetes occurs only in children, but this concept is no longer correct, both types of diabetes are found in both children and adults.

In both type 1 and type 2 diabetes, a variety of genetic and environmental factors cause beta-cell destruction or impaired function, leading to a clinically significant rise in blood sugar called hyperglycemia. Once a state of hyperglycemia occurs in the body, the probability of developing diabetes increases significantly in patients with all types of diabetes, the probability of developing diabetes can also be greater or lesser depending on the nature of different patients. This possibility is more common in type 1 diabetes patients than in type 2 diabetes patients. Scientific studies have now shown that people with direct relatives who have diabetes are more likely to develop diabetes. This possibility of getting the disease depends only on the age of the directly related relative, he or she will suffer from diabetes at a younger age or at an older age. The exact mechanisms by which beta cells become depleted in excessive numbers are not well defined in type 2 diabetes, but reduced secretion of insulin by beta cells and the development of insulin resistance are a common feature of both types of diabetes. Type 2 diabetes also depends on other contributing factors, such as genetic factors,

inflammation, and stress. Future disease classification of diabetes will depend on genetic factors and the insulin secretion status and function of beta cells. (American Diabetes Association-2021).

LIMITATION OF MODERN MEDICAL SCIENCE – SCOPE OF AYURVEDA

Although there has been a lot of progress in the treatment of diabetes in recent years, the disease has a deep impact on the patients suffering from it. Especially for younger patients who require unique solutions to address problems arising from long-term complications. Treatment systems that are developed in modern medicine, such as insulin pumps, are still not fully automated and requires patient intervention, especially during physical activity. Although technology can still be considered the leading way to manage diabetes, the ultimate cure can only be achieved through biological variants that ensure stabilization of the insulin regeneration process in the patient's body, such as pancreas transplantation, islet cell transplantation, stem cells, the possibility of harvesting potentially unlimited beta-cells, and the successful use of immunosuppressive therapies may ultimately lead to a cure for diabetes.

There is actually a big difference between the approach of modern medical practice (allopathic) and Ayurvedic medicine. *Ayurveda* has developed as a holistic system, with a foundational knowledge for understanding physical structure that helps maintain and restore health with minimal side effects, and an emphasis on overall health. Whereas if the analysis remains only on the solution of symptoms instead of studying the physical structure, also has many side effects.

CONCLUSION

By combining modern and traditional medical systems like Ayurveda, Yoga and Naturopathy, better treatment against diabetes can be provided to the patients. For this combined effort it is important to equip the treatment system developed using traditional medical system with modern scientific validation methods. For authentication of all such treatment facilities and to confirm the authenticity and safety of their efficacy, rigorous scientific studies are required. A better option would be to establish more and more modern scientific research institutions, fund studies, and encourage collaboration between modern medical researchers and AYUSH practitioners to bridge this gap. At the same time, necessary guidelines should be prepared for the regulatory institutions to facilitate cooperation between modern medicine and traditional medical practice. This should ensure that guidelines are established for its standardization, quality control, and treatment approach. The main objective of *Ayurveda* is to develop standardization in medical practice, such as medicines, treatment protocols and *Dosha* and person based medical practice. In summary, there is huge potential in combining modern medicine with traditional AYUSH practices to offer better options for improving health

outcomes.

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