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## Exploring role of Stress in Diabetes Mellitus and its management by Ayurveda

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### ABSTRACT:

Diabetes Mellitus is a chronic metabolic lifestyle disorder that has emerged as a major global health issue. While factors like genetics, sedentary lifestyle and poor dietary habits are widely recognized as contributing causes, increasing evidence suggests that psychological stress plays a significant yet often overlooked role in the onset and progression of this disease. In modern medicine, stress is associated with increased secretion of cortisol, adrenaline, and other stress hormones, which interfere with insulin action, increase blood glucose levels, and contribute to insulin resistance. In Ayurveda, Diabetes is described as *Madhumeha*, a condition primarily caused by imbalances in *Kapha* and *Vata* doshas impaired digestion ↓ (*Agnimandya*), and depletion of *Ojas*. Vitiating of *Manodoshas* such as *Krodha* (anger), *Shoka* (grief), and *Udvega* (anxiety) adversely affects *Agni* (digestive fire), leading to *Ama* (toxin) formation and *Ojas* depletion all key factors in diabetes onset per Ayurvedic theory. The study is designed to explore the interrelation between stress and diabetes. It also highlights the role of Ayurvedic interventions in stress management. Ayurvedic therapies like *Abhyanga*, *Shirodhara*, and *Pranayama* are effective in reducing stress, restoring doshic balance, improving insulin sensitivity, and calming the nervous system.

**KEYWORDS:** Diabetes Mellitus, Madhumeha, Prameha, Shirodhara, Abhyanga, Pranayama,

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**INTRODUCTION:**

Diabetes Mellitus, a chronic metabolic lifestyle disorder has become a global health concern in recent decades. In India, the Prevalence rate of Diabetes mellitus is estimated to be 11.4%<sup>1</sup> The increasing prevalence of Diabetes Mellitus (DM) has positioned it as a major lifestyle disorder with multifactorial etiology. While genetic predisposition and unhealthy lifestyle choices (unhealthy diet and sedentary lifestyle) are well-known contributors, increasing evidence points toward psychological stress as a significant and often overlooked trigger., the role of psychological and physical stress in the pathogenesis of diabetes has gained significant attention. From a modern perspective, chronic stress triggers the hypothalamic-pituitary-adrenal (HPA) axis, elevating cortisol and catecholamines like adrenaline and noradrenaline which causes increase in blood sugar level and leads to Diabetes mellitus. In *Ayurveda*, diabetes – “*Madhumeha*”, linked to imbalances in *Kapha* and *Vata doshas*, along with *Agni* (digestive fire) dysfunction . It also recognize “*Chinta*” (excessive worry), “*Manasika Nidana*” as contributing factors in the development of *Madhumeha* . There is a strong interplay between mental stress and metabolic dysfunction. Importantly, the article demonstrates how Ayurvedic therapies-particularly Pranayama, Shirodhara, and Abhyanga-can mitigate stress responses, restore doshic balance, and improve glucose metabolism. These interventions influence both psychological and physiological domains by regulating hormone levels, calming the nervous system, and enhancing insulin sensitivity.

**Aim and objectives -**

Aim -To Explore the role of Stress in Diabetes Mellitus and its management by *Ayurveda*. Objectives – 1) To study role of stress in

Diabetes mellitus. 2) The management of stress by Ayurveda

**Methods and Material**

Data is collected from Classical literature – Ayurvedic Samhita and their commentaries and Modern text books. Database – Google Scholar, Pubmed and other data bases.

**DISCUSSION:**

Diabetes mellitus – Group of lifestyle metabolic disorder which is characters by chronic hyperglycemia with disturbance of carbohydrate , fats and protein metabolism due to absolute or relative deficiency of insulin secretion or and action .<sup>2,3</sup> *Prameha* is a group of metabolic disorders described in *Ayurveda*, *Prameha* is characterized by excessive and abnormal urination (both quantity and quality). It is mainly caused by the vitiation of *Kapha* dosha along with *Medas* (fat) and *Kleda* (fluid imbalance). There are 20 types of *Prameha* . One of them is *Madhumeha*. It is described as a condition where the patient passes sweet urine, resembling honey (“*Madhu*”). *Madhumeha* closely resembles Diabetes Mellitus in modern medicine.

BSL is control by 2 group of hormones -

1) Insulin - Decrease BSL 2) Cortisol , Adrenaline ,noradrenaline - Increase BSL Stress causes Increase in the level of Cortisol , Adrenaline ,noradrenaline hormones which causes increase in blood sugar level and leads to Diabetes mellitus . Stress Hormone and Glucose Regulation Stress triggers a hormonal response that leads to an increase in cortisol and adrenaline levels. These elevated stress hormones interfere with the body's ability to use insulin effectively, resulting in insulin resistance. Additionally, they stimulate the liver to release more glucose into the bloodstream, contributing to elevated blood sugar levels. Chronic stress can therefore lead to persistently high blood glucose levels, a condition known as



hyperglycemia, which increases the risk of developing type 2 diabetes mellitus.

Ayurvedic interpretation - In *Ayurveda*, body is considered as a conjugation of Panchamahabhuta, soul and mind. Stress can be interpreted in different ways according to *Ayurveda*. Stressors (stress inducing factors) recognized in *Ayurveda* can be - 1) Physical stress - Excessive exercise, trauma, fasting etc.

2) Mental/ Psychological stress - Anger, fear, anxiety, grief etc.

3) Environmental stress - Exposure to intense heat of sun, high altitude etc.

Physical Stress and Diabetes Mellitus

Ayurvedic View: Physical stress, *Sahasa* cause depletion of *Ojas* which is the essence of *Sapta Dhatus* and represent the strength of body. *Ojakshaya* leads to *Dhatu Kshaya* and the person becomes weak and emaciated which causes *Vataprakop* causing *Vishamagni*. *Vishamagni* causes *Ama* formation leading to *Dhatu Dushti*<sup>11</sup>. If *Medo Dhatu* is affected, prodromal symptoms of *Prameha* can be seen. In *Prameha Samprapti*, it is told that *Ojas*, more precisely *Apara Ojus* is expelled out from the body through sweat and urine since *Atipravarthi* of *Sweda* and *Mootra* is seen in *Prameha*. So, *Ojakshaya* can lead to *Madhumeha*.

Modern View: In modern science, physical stress caused by overtraining or excessive exercise increases cortisol levels. This elevation in cortisol level enhances appetite, especially cravings for high-calorie food. That promotes fat redistribution, resulting in central obesity and insulin resistance. These metabolic disturbances elevate blood sugar levels, contributing to the onset of Diabetes Mellitus. Mental Stress and Diabetes mellitus - Ayurvedic View: According to *Ayurveda*, mental stress arises due to the vitiation of *Manodoshas* such as *Krodha* (anger)<sup>9</sup> in *Pitpradhan Prameha nidana*, *Udvega* (anxiety), and *Shoka* (grief)<sup>10</sup> in *Vataj prameha*

*nidana*. These emotions cause an imbalance in *Sharir Doshas*, leading to *Agnimandya* (weakened digestive fire) and the formation of *Ama* (toxins). The accumulated *Ama* tends to localize in *Basti* (urinary system), which results in *Madhumeha* (diabetes mellitus).

Modern View: From a modern perspective, chronic mental stress activate hypothalamus pituitary adrenal axis which secrete Glucocorticoid and catecholamine.

This Glucocorticoid -Cortisol

1) It stimulate gluconeogenesis and decreases level of glycogen which leads to hyperglycemia<sup>6</sup>.

2) It also causes Decrease or inhibition of glucose uptake by muscle and other cells which leads to hyperglycemia<sup>6</sup>.

3) It causes Beta cell dysfunction and decreases the insulin secretion which causes increase blood sugar level.

4) It antagonise metabolic action of insulin that leads to hyperglycemia<sup>7,8</sup>

5) It Impaired incretin effect and leads increase insulin resistance which causes increase in level of blood sugar. Thus Elevated cortisol levels raise blood sugar levels, eventually contributing ultimately to the development of Diabetes Mellitus. Management of Stress by Ayurvedic Way – *Pranayam* - Regulates the Nervous System - *Pranayama* techniques like alternate nostril breathing and *Bhramari pranayama* can influence the autonomic nervous system, balancing the sympathetic (fight-or-flight) and parasympathetic (rest-and-relax) responses. Reduces Stress Hormones: Certain *pranayama* practices can help lower the levels of stress hormones like cortisol. Calms the Mind and Body: Deep, controlled breathing promotes a sense of calm and relaxation, counteracting the effects of stress and anxiety. Improves Sleep Quality- *Pranayama* can help regulate sleep patterns, leading to better sleep quality, which is often disrupted by stress. Increases Concentration

and Focus -Regular practice can improve mental clarity and concentration, making it easier to manage stressful situations. Promotes Emotional Balance - By calming the mind and body, pranayama can help individuals develop greater emotional resilience and better manage negative emotions. *Abhyanga* - It stimulates nerve ending in skin and sending signal to central nervous system. This signals trigger release of endorphin which have pain relieving and mood boosting effect. It stimulates release of happy hormones like Endorphine, Serotonin and Dopamine which improves mood and reduces stress<sup>12</sup>. It lowers stress hormones like Cortisol. Physical Relaxation- The warm oil and gentle massage movements help soothe muscles, relieve tension, and improve flexibility, easing physical symptoms of stress. Mental Calming - *Abhyanga*'s rhythmic strokes and the aromatic oils used can calm the mind, reduce anxiety, and promote a sense of tranquility, helping to alleviate mental stress. Nervous System Support -*Abhyanga* helps to balance and calm the nervous system, which can be overactive during periods of stress, leading to a more balanced and relaxed state, Emotional Balance. The relaxing effects of *Abhyanga* can improve sleep quality, which is often disrupted by stress. Dosha Balancing - In Ayurveda, *Abhyanga* is used to balance the three doshas (Vata, Pitta, and Kapha), which are believed to govern different aspects of our physical and mental well-being. By balancing these doshas, *Abhyanga* can help to reduce stress and promote overall health. *Shirodhara* -*Shirodhara*, a traditional Ayurvedic therapy, a significant role in stress management by promoting deep relaxation and mental clarity. The treatment involves the rhythmic pouring of warm, medicated oil onto the forehead, inducing a calming effect on the nervous system. This helps to alleviate symptoms of anxiety, insomnia, and other

stress-related conditions. It calms the Nervous System- It stimulates the nervous system, promoting relaxation and reducing overstimulation. The treatment helps to quiet the mind, reduce racing thoughts, and alleviate feelings of anxiety and irritability, leading to improved mental clarity. Improving Sleep Quality by activating Vagus nerve and trigger Peripheral nervous system, making it beneficial for those struggling with insomnia. It reduces the impact of stress on mental and physical health. Hormonal Balance - *Shirodhara* can influence the pituitary and pineal gland and play a role in regulating hormones, which potentially leads to better emotional balance. It lowers Cortisol level, It produces Melatonin, a hormone that plays a crucial role in sleep. It regulates Serotonin level which is associated with mood and happiness. It increases dopamine level which is linked to mood and motivation.<sup>13</sup>

#### CONCLUSION:

Stress plays a significant role in the onset and progression of Diabetes Mellitus. Modern research and Ayurvedic wisdom both acknowledge the deep interconnection between the mind and body in chronic diseases like diabetes. *Ayurveda* emphasizes not only the management of physical symptoms but also the restoration of mental balance. Therapies such as *Shirodhara*, *Abhyanga*, and *Pranayama* have shown remarkable benefits in reducing stress, balancing doshas, and enhancing insulin sensitivity. These interventions not only help regulate blood sugar levels but also rejuvenate the nervous system and calm the mind. Ayurvedic therapies offer promising, non-pharmacological options that deserve more recognition and integration in modern clinical practice.

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