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## A Review on Yoga an alternative therapy in Diabetes

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### ABSTRACT

Diabetes is a condition where pancreas fails to produce insulin hormone, which converts the sugar in the food into energy. Insufficient secretion of insulin results in excess glucose level in the bloodstream, resulting in diabetes. The blood glucose is required to be used to provide energy and fuel to the body to do all kinds of activities. High level of glucose in blood eventually affects the organs of the body. Yoga considered as an alternate source of healing in diabetes. Yoga helps to strengthen the immune system, improves blood circulation and the flow of vital energy or prana to the internal organs of the body. The secretion of stress hormones, due to faulty diet, hectic lifestyle or wrong thinking is controlled by the practice of yoga. Yogic exercises cause the muscles to absorb the excess glucose in the blood stream, thereby reducing the blood sugar level. They stimulates the pancreas and liver to function effectively, which regulates the blood sugar levels. Asanas help in regeneration the pancreatic cells, thereby assisting insulin secretion. The muscular movements also help in bringing down the blood sugar levels. Asanas induce relaxation & plays a key role in the healthy functioning of the internal organs. Ex : Paschimotasana, Shalabhasana, Mayurasana A profound understanding of yoga enables introspection. When attention is turned inwards, it effects a radical change in our beings, manifest as inward balance and poise. As peace fills our being, the body begins to function in harmony & improves the quality of life a sign of good health.

**Keywords:** Yoga, Diabetes, Asanas

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## INTRODUCTION

In Sanskrit, yoga (from the root *yuj*) means "to add", "to join", "to unite", or "to attach" in its most common literal sense.<sup>R1</sup> In the context of the *Yoga Sutras of Patanjali*, the root *yuj samādhau* (to concentrate) is considered by traditional commentators as the correct etymology. In accordance with Paṇini, Vyasa who wrote the first commentary on the *Yoga Sutras*, states that yoga means *samādhi* (concentration)<sup>R3</sup> The ultimate goal of Yoga is *moksha* (liberation), although the exact definition of what form this takes depends on the philosophical or theological system with which it is conjugated. Due to the influence of Vivekananda, the *Yoga Sutras of Patanjali* are nowadays considered as the foundational scripture of classical yoga, a status which it only acquired in the 20th century. Before the twentieth century, In the 1980s, yoga became popular as a system of physical exercise across the Western world.<sup>R4</sup>

Diabetes mellitus (DM), commonly referred to as diabetes is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period.<sup>R5 [2]</sup> Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. Diabetes is due to either the pancreas not producing enough insulin or the cells of the body not responding properly to the insulin produced.<sup>R6</sup>

Type 1 DM results from the pancreas's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown.<sup>R2</sup>

Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as "non insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The most common cause is sedentary life style & excessive stress.<sup>R2</sup>

Gestational diabetes is the third main form and occurs when pregnant women without a previous history of diabetes develop high blood-sugar levels.<sup>R2</sup>

### Postures of few yogas:

#### **Pavanmuktasana :**<sup>R7</sup>

It is performed in following steps : Person instructed to Lie flat on back and keep the legs straight and relax breath deeply and rhythmically. He has to Inhale slowly and lift the legs and bend in the knee. Bring upwards to the chest till his thigh touches to Abdomen. Then Hug knees in place and lock fingers. He has to Try to touch the knee with his nose tip. This is not easy in first time. But regular practice he can do this. Hold this position for 20 to 30 seconds. Later on can extend it till 1 minute as per capability. Now exhale slowly and come back to the original position that is Shavasana (Lie straight)

**Benefits Pavanamuktasana :**

Pavanamuktasana is considered to be good for excusing all abdominal organs. Pavanamuktasana cures Gastro intestine problems like hyperacidity indigestion and constipation. Regular practice pavanamuktasana cures most of the gastrointestinal problems. It is Helpful for those suffering from gas problems, hyperacidity, arthritis pain, heart problems and waist pain. It strengthens back muscle and cures back pain. Pavanamuktasana is very beneficial for reproductive organ and for menstruation disorder. Apart from all these it will prevent excess accumulation of fat in abdomen leading to obesity.

**Ushtrasana : <sup>R8</sup>**

It is performed in following steps : person should Sit on knees and bend backwards. Hold right ankles or heel with right hand and left ankle or heel with left hand. Now he has to bend his neck and head backwards as much as you can and push waist area slightly forward. Breathing should be normal for 6 to 10 seconds in this position. After 6 to 10 seconds return to the first position by bending forward. Release your hands from heels. This is your one round of Ushtra Asana. Repeat this for some more rounds.

**Benefits for Ushtrasana yoga :**

Regular practice of ustrasana stimulates abdomen organs like pancreas, liver, spleen etc. & improves the digestion. It brings flexibility in chest, abdomen and spine. Apart from this it helps to increase chest size and lungs capacity. It improves the function of the respiratory system, thus beneficial in Asthmatic condition. It cures problems related to Neck, Shoulders and back. Gives strength to back muscles. Stimulate thyroid gland. Releases back pain. Increases blood circulation to brain. Ustrasana improves body Posture by reducing mainly abdominal fat.

**Dhanurasana : <sup>R9</sup>**

It is performed in following steps : Person is instructed to Lie on the ground (on Abdomen) in prone posture. Relax completely with 2-3 breaths. Inhale slowly and starts bending your legs backwards and catch the ankles with the hands. Lift the chest & thigh above the ground so that abdomen should touch the ground Now body will be in the shape of a bow. At this time whole weight will be on abdomen. which will touch the ground. Hold this position for few 15-20 seconds and instructed to continue deep breath. one can increase the time after practicing this. Now after 15-20 seconds exhale slowly and come back to starting position.

**Benefits for Dhanurasana yoga :**

Regular practice of dhanurasana Improves the function of abdomen organs like liver, pancreas, small intestine and large intestine. This leads to proper functioning of those organs resulting in improving digestion capacity and appetite cures gastrointestinal problems,

constipation. It gives flexibility to the back. Strengthens back muscles. It improve the function of the pancreas, controls the sugar level in the blood thus practice of this yoga is beneficial in diabetes. It also helps in improving the functions of kidney and liver. It helps in maintaining good body posture, Releases back pain. Apart from the above it helps to cure obesity, rheumatism. It improves blood circulation. Act as a stress reliever, strengthens ankles, thighs, groins, chest, and abdominal organs. Cure menstruation disorder. Helpful is stimulating reproductive organs.

### **Bhujangasana :<sup>R10</sup>**

It is performed in following steps : Person is instructed to Lie down on Abdomen and said to Take a deep breath. Both the hands were placed beside chest and with the support of both hands lift upper body like head, neck, shoulders, chest upwards. Hold this position for some time. Now exhale and bring upper body to the ground.

### **Benefits for *Bhujangasana* yoga :**

Regular practice of yoga stretches muscles in shoulders, chest and abdomen. It decreases stiffness of the lower back, Strengthens the arms and shoulders, increases flexibility. It improves menstrual irregularities by strengthening reproductive organs. Firms and tones the buttocks. It invigorates the heart & Stimulates organs in the abdomen like Pancreases, liver & kidney etc. It relieves stress and fatigue. Opens the chest and helps to clear the passages of the heart and lungs. It improves circulation of blood and oxygen, especially throughout the spinal and pelvic regions.

### **Halasana :<sup>R11</sup>**

It is performed in following steps : Person is instructed to Lie on back. Join the legs together. Relax the whole body. (Shavasana position). Keep the palm flat on the ground. Keep breathing normally. While exhaling press the palm on ground and raise both the legs upwards straight then try to touch the ground just behind. Breathe slowly and hold the posture for several minutes (1-2 minutes). Now slowly release the pose to return to Shavasana.

### **Benefits for *Halasana* yoga :**

It helps, strengthens the abdominal muscles. It helps to make spinal cord strong and flexible.

### **Paschimottanasana<sup>R12</sup>**

It is performed in following steps: Sit down straight with your legs together by stretching in front of you. keep your head neck and spine erect. Place the palms on your respective knees. Now bend your head and trunk slowly forward to catch the toes with the thumb, index and middle fingers without bending knees. Take a deep breath and exhale slowly. Try to touch your head to your both knees. Bend the arm and try to touch the elbow on the floor. Exhale

completely and holding out your breath stay in this posture for a few seconds. After few seconds slowly return to your starting position. breathe normally. Repeat this for 3-4 times.

### **Benefits for Paschimottanasana yoga:**

While practicing this Paschimottanasana the intestines, gall bladder are smoothly pressed and stimulates well, strengthens spinal cord, spinal nerves are pulled during the time of asana. It prevents diabetes. It increases the fertility factor of male, removes the infertility. Abdomen pain, headache, piles, hip pain, back pain and body weakness are cured by doing this asana. The menstrual problem will be cured for the ladies. Hip bones will become strengthen. For women can do this asana before marriage can give birth from normal delivery by strengthening their bones and inner reproductive organs. This asana helps to increase the concentration capacity.

### **Shalabhasana (Locust Pose) <sup>R13</sup>**

It is performed in following steps : Person is instructed to Lie down on Abdomen & place both hands underneath the thighs. Inhale and lift both legs up, ( leg should not bend at the knee). Meanwhile chin should rest on the ground. Hold this position about ten to twenty seconds. After that exhale and take down leg in the initial position.

### **Benefits for *shalabhasana* yoga :**

It is beneficial in all the disorders at the lower end of the spine. Most helpful for backache and sciatica pain. Useful for removing unwanted fats around abdomen, waist, hips and thighs. Daily practice of this Asana can cures cervical spondylitis and spinal cord ailments. Strengthening your wrists, hips, thighs, legs, buttocks, middle & lower abdomen and diaphragm. Toughens back muscles. This exercise helps to cure diabetes and prostate gland problems. This cures various abdominal troubles including problems in the area of kidneys, liver, and pancreas.

### **Mayurasana <sup>R14</sup>**

It is performed in following steps : Begin by sitting on heels. Make sure your knees are wide apart. Place the hands on the floor, and let fingers point towards body. Gently bend elbows and press them towards abdomen. one must keep belly firm. To do this, drop head on the floor and work up the strength in your stomach. Stretch legs out, such that knees are straight, and the upper part of feet are facing the floor. Shoulder blades must be firm and pushed into back. Tighten your buttocks and raise your head. Set your gaze forward. Shift your body weight forward and lift your legs off the floor. Your body must be lifted with the weight on the hands. It should be parallel to the floor. Hold the pose for about 10 seconds initially. With practice, you should be able to hold it for up to one minute. To release, drop your head and feet on the ground. Relax.

**Benefits for Mayurasana yoga :**

Improves the function of digestive system and makes abdomen stronger. Peacock Pose is beneficial in piles and diabetes. Strengthens and tones your reproductive system. Mayurasana Improves sexual activity. Makes your elbows, wrist, spine and shoulders stronger. Mayurasana improves posture. Reduces anxiety and stress and give calmness to mind. Increases your focusing power of mind.

**Surya Namaskar (Sun Salutation)** <sup>R15</sup> is the combination of 12 different asana (Yoga poses).

It is performed in following steps :

**Pranamasana :** Stand straight and erect in such a way that your face is in the direction of the sun. Both feet should be touching each other. Bring your hands close to your chest by touching palm to palm called Namaskar ( Salutation).

1. **Hastauttanasana :** Take a deep breath and raise your hand in upward direction.
2. **Padahastanasana :** Now breathe out slowly and bend forward. Hands should be lined with your feet and head touching your knees.
3. **Ashwa Sanchalanasana :** Inhale slowly and extend the right leg back and drop the knee to the ground. Bend the left knee and hands should be firm with the ground.
4. **Parvatasana :** During exhaling bring the right leg back to join the left leg. Raise your buttocks upwards forming triangle.
5. **Ashtanga Namaskar :** Exhale until your feet, knees, hands, chest, forehead touches the ground. Hold the breath.
6. **Bhujangasana :** On inhaling raise your head in an upward direction and bend in backward direction as much you can. It is called bhujagasana pose.
7. **Parvatasana :** Now exhale slowly and make upward arc as shown in fig.
8. **Ashwa Sanchalanasana :** Inhale slowly and extend the right leg back and drop the knee to the ground. Bend the left knee and hands should be firm with the ground.
9. **Padahastanasana :** Now breathe out slowly and bend forward. Hands should be lined with your feet and head touching your knees.
10. **Hastauttanasana :** Take a deep breath and raise your hand in upward direction.
11. **Pranamasana :** Stand straight and erect in such a way that your face is in the direction of the sun. Both feet should be touching each other. Bring your hands close to your chest by touching palm to palm called Namaskar ( Salutation).

**Benefits of Surya Namaskar (Sun Salutation) :**

Effective in weight loss. Increase the size of the chest and gives perfect shape. It improves digestion of food & appetite, cures constipation. Increases body flexibility. Cure your



digestive, circulatory, respiratory and nervous systems. Helps to reduce stress and stay calm. It strengthens the arms, back, shoulders and legs, hips, quads and calves. Improve posture. It gives physical and mental strength. In one word it is one of the excellent asana for entire body

### **Over all Benefits of yoga in DM :**

In DM recommended mainly works on abdominal organs. So the asanas excretes pressure on internal organs specially pancreas thus facilitates proper blood circulation, proper functioning of organs thus resulting maintenance of good health of an individual.

Abdominal stretching during yoga exercise causes gentle massage, rejuvenation/regeneration of cells of pancreas increasing the utilization and metabolism of glucose in peripheral tissues, liver, and adipose tissues through enzymatic process. The asanas which were discussed above reduces centripetal obesity (belly fat) which is one of the triggering causes to manifest diabetes.<sup>R,16,17,18</sup>

Pancreas is the organ influenced by various asanas in DM cases & it is observed that sensitivity of  $\beta$ -Cells of pancreas also increased leading to increase in plasma insulin level. Yoga postures can lead to improvement in the sensitivity of the  $\beta$ -Cells of pancreas to glucose signal and also the improvement in insulin secretion.<sup>R18</sup>

During yogasanas muscular tissues in the body tend to relax and stretch which leads to proper blood supply & consumption of sugar from blood it also enhances insulin receptors to support in this function thus increases the insulin level & decreases the blood sugar level.<sup>R19</sup>

Regular yogasanas are effective in reducing the cholesterol level specially triglyceride level and it was inferred in study that increased use of triglycerides by adipose tissue. It is found that the weight loss decrease in body mass index, waist, hip circumference<sup>R20, 21,22</sup>

The improvement in the lipid levels after yoga could be due to increased hepatic lipase and lipoprotein lipase at cellular level, which affects the metabolism of lipoprotein and thus increase uptake of triglycerides by adipose tissues. There have been reports of weight loss, decrease in body mass index and waist-hip ratio, stress reduction, improvement in mood, self-efficacy and quality of life.<sup>R23</sup>

A study conducted on type 2 DM 20 patients where all the patients were subjected to 40 days yoga routine with an expert yoga teacher. The postures performed were: Surya namaskar (sun salutation), Trikonasana (triangle pose), Tadasana (mountain pose), Padmasana (lotus pose), Bhastrika Pranayama (breathing exercise), Pashimottanasana (posterior stretch), Ardhamatsyendrasana (half spinal twist), Pawanmuktasana (joint freeing series), Bhujangasana (cobra pose), Vajrasana (thunderbolt pose), Dhanurasana (bow pose), and Shavasana (corpse pose). At the end of 40 day duration of performing the asanas, the study

participants had a significant decrease in FBS, PPBS, serum cholesterol, Serum triglycerides, HbA1c, levels, waist-hip ratio and beneficial changes in insulin levels.<sup>R24</sup>

Numerous studies have shown yoga to have an immediate effect down regulating the response of SNS -HPA axis to stress. Studies show that yoga decreases levels of salivary cortisol, blood glucose as well as plasma renin levels, and 24-hour urine norepinephrine and epinephrine levels.<sup>R25</sup>

Most of the works related to yogic practice have been carried out only in type 2 diabetic patients. The associated risk indices have been evaluated in about 25 studies with yogic intervention ranging from 8 days to 12 months. These include decreased blood glucose levels and glycosylated hemoglobin level and also showed improvement in the glucose tolerance test (GTT). A decrease in fasting insulin level, rise in insulin receptors, increased percentage of receptor binding (even before glycemic control) suggests decreased insulin resistance and improved sensitivity.<sup>R26, 27</sup>

Thus yoga may be recommended to diabetics as non drug & an alternative therapy to treat & cure the disease condition.

## CONCLUSION

After going through these above mentioned over all benefits of yogas and various research works on yoga It is observed that common thing is yoga helps in reducing the blood sugar level. It stimulates the pancreas & increases the secretion of insulin thus maintain the normal sugar level. Apart from that it helps in reducing stress. Thus yoga can be considered as an alternative therapy in DM.

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