



A Review Study on the Effect of *Patchimothasana* in Type 2 Diabetes Mellitus

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ABSTRACT:

Siddha system of medicine is one of the traditional systems of medicine which treats not only the body also the mind. The word Siddha has its origin in the Tamil word Siddhi which means “heavenly bliss”. In Siddha System of Medicine, Yogam forms an important part. Many Siddhars have dealt with Yogam. Siddhars believed that a healthy soul can only be developed through a healthy body. So they developed methods and medications to strengthen their physical body and thereby their souls. Diabetes mellitus is a metabolic disorder characterized by high blood glucose level, associated with other manifestations. Type 2 diabetes mellitus is due to insulin resistance. So, the body is unable to use insulin. About 90% of diabetic patients have type 2 diabetes mellitus. Yoga practice is useful in the management of various lifestyle diseases, including type 2 diabetes. Psycho-neuro-endocrine and immune mechanisms are involved in the beneficial effects of yoga on diabetes. In *Patchimothasana* the abdomen is compressed, by this action the pancreatic cells are rejuvenated and pancreatic β -cell sensitivity is increased. Improved blood supply to muscles by this Asana may enhance insulin receptor expression in the muscles, causing increased glucose uptake in muscles.

Key words: Siddha, Yoga, Type 2 Diabetes mellitus, Asana, *Patchimothasana*.

INTRODUCTION:

Siddha system of medicine is one of the traditional systems of medicine which treats not only the body also the mind. The word Siddha has its origin in the Tamil word Siddhi which means “perfection” or “heavenly bliss”. *Kayakarpam* (rejuvenation), Siddhar Yogam therapy, *Vaasi* (*Pranayamam*), *Varmam* (pressure manipulation technique) and *Muppu* (the universal salt) are the specialties of the Siddha system of medicine.

In Siddha System of Medicine, Yogam forms an important part. Many Siddhars have dealt with Yogam. Siddhars believed that a healthy soul can only be developed through a healthy body. So they developed methods and medications to strengthen their physical body and thereby their souls. They practiced intense Yogic practices, including years of periodic fasting and meditation. They were believed to achieve supernatural powers, gained supreme wisdom and immortality.

Diabetes mellitus is a metabolic disorder characterized by high blood glucose level, associated with other manifestations. ‘Diabetes’ means ‘polyuria’ and ‘mellitus’ means ‘honey’. Type 2 diabetes mellitus is due to insulin resistance. So, the body is unable to use insulin. About 90% of diabetic patients have type 2 diabetes mellitus. It usually occurs after 40 years^[1].

Asanas emphasize the relationship of body, mind, and awareness, focusing on the synchronization of breathing and movement. They involve stretching movements and relaxation. *Patchimothasana* massages and pressurizes the pancreas, stimulating insulin secretion and Improve blood circulation to the abdomen^[2]. In patients with diabetes, pancreatic cells may be rejuvenated and pancreatic β -cell sensitivity may be increased by the alternating abdominal contractions and relaxations involved in Asanas like *Patchimothasana*. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake^[3].

TYPE 2 DIABETES MELLITUS:

Diabetes mellitus is a clinical syndrome with many causes, which is characterized by the presence of hyperglycaemia. Type 2 diabetes accounts for around 90% of cases, while type 1 diabetes accounts for most of the remainder. In type 1 diabetes, there is an absolute deficiency of insulin because of an immune-mediated destruction of insulin-producing β cells in the pancreatic islets of Langerhans. In contrast, in type 2 diabetes, concentrations of circulating insulin are typically elevated, but there is a relative deficiency of insulin because there is reduced sensitivity to insulin in peripheral tissues and the β cells cannot make sufficient insulin to overcome this ‘insulin resistance’^[4].

Risk factors for type 2 Diabetes mellitus ^[5]:

- Family history of type 2 DM
- Obesity
- Habitual physical inactivity
- Race and ethnicity (Blacks, Asians, Pacific Islanders)
- Previous identification of impaired fasting glucose or impaired glucose tolerance
- History of gestational DM or delivery of baby heavier than 4 kg
- Hypertension
- Dyslipidemia (HDL level < 35 mg/dl or triglycerides > 250 mg/dl)
- Polycystic ovary disease and acanthosis nigricans
- History of vascular disease.

Pathogenesis of Type 2 DM ^[5]:

The basic metabolic defect in type 2 DM is either a delayed insulin secretion relative to glucose load (impaired insulin secretion), or the peripheral tissues are unable to respond to insulin (insulin resistance).

1. Genetic factors: Genetic component has a stronger basis for type 2 DM than type 1A DM. No definite and consistent genes have been identified.
2. Constitutional factors: Certain environmental factors such as obesity, hypertension, and level of physical activity play contributory role and modulate the phenotyping of the disease.
3. Insulin resistance: One of the most prominent metabolic features of type 2 DM is the lack of responsiveness of peripheral tissues to insulin, especially of the skeletal muscle and liver. Obesity, in particular, is strongly associated with insulin resistance and hence type 2 DM. Mechanism of hyperglycaemia in these cases is explained as under:
 - ☒ Resistance to action of insulin impairs glucose utilization and hence hyperglycaemia.
 - ☒ There is increased hepatic synthesis of glucose.
 - ☒ Hyperglycaemia in obesity is related to high levels of free fatty acids and cytokines (e.g. TNF- α and adiponectin) affect peripheral tissue sensitivity to respond to insulin.
4. Impaired insulin secretion: In type 2 DM, insulin resistance and insulin secretion are interlinked:
 - ☒ Early in the course of disease, in response to insulin resistance there is compensatory increased secretion of insulin (hyperinsulinaemia) in an attempt to maintain normal blood glucose level.
 - ☒ Eventually, however, there is failure of β -cell function to secrete adequate insulin, although there is some secretion of insulin i.e. cases of type 2 DM have mild to moderate deficiency of insulin but not its total absence.
5. Increased hepatic glucose synthesis: One of the normal roles played by insulin is to promote hepatic storage of glucose as glycogen and suppress gluconeogenesis. In type 2 DM, as a part of insulin resistance by peripheral tissues, the liver also shows insulin resistance i.e. in spite of hyperinsulinaemia in the early stage of disease, gluconeogenesis in the liver is not suppressed. This results in increased hepatic synthesis of glucose which contributes to hyperglycaemia in these cases.

MATERIALS AND METHODS:

PATCHIMOTHASANA (Seated forward bend pose):

Steps ^[6]:

- * Sit on the floor with the legs outstretched, feet together and hands on the knees. Relax the whole body.
- * Slowly bend forward from the hips, sliding the hands down the legs. Try to grasp the big toes with the fingers and thumbs. If this is impossible, hold the heels, ankles or any part of the legs that can be reached comfortably. Move slowly without forcing or jerking.
- * Hold the position for a few seconds. Relax the back and leg muscles, allowing them to gently stretch.

- * Keeping the legs straight and utilizing the arm muscles, not the back muscles, begin to bend the elbows and gently bring the trunk down towards the legs, maintaining a firm grip on the toes, feet or legs.
- * Try to touch the knees with the forehead. Do not strain. This is the final position. Hold the position for as long as is comfortable and relax.
- * Slowly return to the starting position. This is one round.

Breathing ^[6]:

- ❖ Inhale in the starting position.
- ❖ Exhale slowly while bending forward.
- ❖ Inhale in the static position.
- ❖ Exhale while bringing the trunk further towards the legs with the arms.
- ❖ Breathe slowly and deeply in the final position or retain the breath out if holding for a short duration.
- ❖ Inhale while returning to the starting position.

Duration ^[6]:

Beginners should perform up to 5 rounds, staying in the final position for only a short length of time. Adept may maintain the final position for up to 5 minutes.

Awareness ^[6]:

- Physical - on the abdomen, relaxation of the back and leg muscles, or the slow breathing process.
- Spiritual - on *swadhisthana* chakra.

Sequence ^[6]:

This asana should precede or follow backward bending asanas such as *setuasana*, *chakrasana*, *bhujangasana* or *matsyasana*.

Contra-indications ^[6]:

People who suffer from slipped disc, sciatica or hernia should not practice *paschimottanasana*.

Benefits:

This asana stretches the hamstring muscles and increases flexibility in the hip joints. It tones and massages the entire abdominal and pelvic region, including the liver, pancreas, spleen, uro-genital system, kidneys and adrenal glands. It helps to remove excess weight in this area and stimulates circulation to the nerves and muscles of the spine ^[6]. Due to the extra stretch given to the pelvic region more oxygenated blood is brought there and the gonad glands absorb the required nutrition from the blood. This increases vitality, helps to cure impotency ^[7].

DISCUSSION:

As per the WHO, diabetes mellitus (DM) is defined as a heterogeneous metabolic disorder characterized by common feature of chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism. DM is a leading cause of morbidity and mortality world over. It is expected to continue as a major health problem owing to its serious complications, especially end-stage renal disease, ischemic heart disease, gangrene of the lower extremities, and blindness in the adults ^[5].

Yoga, which originated in India more than 5,000 years ago, aims at balancing and harmonizing the body, mind, and emotions. Increasing evidence suggests that yoga practice tackles the pathophysiologic mechanisms of diabetes and helps in controlling diabetes and its complications. Psycho-neuro-endocrine and immune mechanisms are involved in the beneficial effects of yoga on diabetes. Incorporation of yoga practice in daily life helps to attain glycemic control and reduces the risk of complications in people with diabetes ^[2].

Mechanism of action of asanas in type 2 diabetes mellitus:

- ☑ Rejuvenates of pancreatic cells through the alternating abdominal contractions and relaxations ^[2].
- ☑ Improves blood supply to muscles. This is achieved through the alternative contractions and relaxations of the abdomen ^[2].
- ☑ Enhances insulin receptor expression in the muscles, causing increased glucose uptake by muscles ^[3].

- Have positive effects on glucose utilization and fat redistribution in type 2 diabetes ^[8].

Forward bending asanas like *Patchimothasana* massages and pressurizes the pancreas, stimulating insulin secretion. This is achieved through the alternative contractions and relaxations of the abdomen ^[2].

CONCLUSION:

Diabetes is a chronic metabolic disease that adversely affects quality of life ^[9]. Stress increases the risk and severity of diabetes by stimulating the hypothalamic-pituitary-adrenal (HPA) and sympathetic axes and parasympathetic withdrawal, resulting in increases in the level of stress hormones ^[10]. Chronic activation of the HPA axis is associated with poor control of diabetes and complications such as diabetic neuropathy. Yoga effectively reduces stress, thereby helping diabetes control ^[11]. Abdominal stretching during *Patchimothasana* is believed to result in the regeneration of pancreatic cells. *Patchimothasana* massages and pressurizes the pancreas, stimulating insulin secretion and improve blood circulation to the abdomen. Improved blood supply to muscles may enhance insulin receptor expression in the muscles, causing increased glucose uptake. Hence, *Patchimothasana* has proven effects in preventing complications of type 2 Diabetes mellitus by reducing blood glucose levels.

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