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Yoga for diabetes mellitus

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Abstract

There are different approaches to yoga including spiritual, therapeutic, and developmental. However, the underlying premise of mind–body exercise modalities like yoga is that the physiological state of the body can affect emotions, thoughts, and attitudes, which in turn have a reciprocal effect on the body. Diabetes mellitus has reached epidemic proportions worldwide as we enter the new millennium. The World Health Organization (WHO) has commented there is ‘an apparent epidemic of diabetes, which is strongly related to lifestyle and economic change’. Over the next decade the projected number will exceed 200 million. Most will have type-2 diabetes, and all are at risk for the development of complications. Diabetes represents a spectrum of metabolic disorders, which has become a major health challenge worldwide. The unprecedented economic development and rapid urbanization in Asian countries, particularly in India, China and Sri Lanka has led to a shift in health problems from communicable to non-communicable diseases. Of all the non-communicable diseases, diabetes and cardiovascular diseases lead the list. The purpose of this study is to provide a comprehensive overview of the situation regarding yoga for diabetes mellitus, and explore the possible strategies that could be effective in combating the spread and focus on human being for healthy life. Yoga therapy is the adaptation of yoga practices for people with health challenges. Yoga therapists prescribe specific regimens of postures, breathing, exercise and relaxation techniques to suit individual needs. Medical research shows that yoga therapy is among effective complementary therapies for several common ailments. Hence it has been concluded that Yoga cannot “cure” diabetes, but there are several ways yoga can be beneficial in controlling diabetes. If medically prescribed regimens are followed by diabetic patient, they can safely add yoga to their treatment. Due to the potential impact on their glucose levels, and overall body function, great strides can be made through regular committed yoga practice. Therefore, regular practice of yoga may prevent and control the status of diabetes mellitus and produce optimum healthy population.

Keywords: Yoga, Diabetes, Yoga Therapy

1. Introduction

There are different approaches to yoga including spiritual, therapeutic, and developmental (Herrick and Ainsworth, 2000) ^[8]. However, the underlying premise of mind–body exercise modalities like yoga is that the physiological state of the body can affect emotions, thoughts, and attitudes, which in turn have a reciprocal effect on the body (Ives and Sosnoff, 2000) ^[9].

Diabetes mellitus has reached epidemic proportions worldwide as we enter the new millennium. The World Health Organization (WHO) has commented there is ‘an apparent epidemic of diabetes, which is strongly related to lifestyle and economic change’. Over the next decade the projected number will exceed 200 million. Most will have type-2 diabetes, and all are at risk for the development of complications.

Diabetes represents a spectrum of metabolic disorders, which has become a major health challenge worldwide (King, 1998) ^[12]. The unprecedented economic development and rapid urbanization in Asian countries, particularly in India has led to a shift in health problems from communicable to non-communicable diseases. Of all the non-communicable diseases, diabetes and cardiovascular diseases lead the list (Mehta, 2009) ^[14, 15].

Over 30 million have now been diagnosed with diabetes in India. The CPR (Crude prevalence rate) in the urban areas of India is thought to be 9 per cent. In rural areas, the prevalence is approximately 3 per cent of the total population. The population of India is now more than 1000 million: this helps to give an idea of the scale of the problem. The estimate of the actual number of diabetics in India is around 40 million. (Diabetes.co.uk, 2010. <http://www.diabetes.co.uk/>).

This means that India actually has the highest number of diabetics of any one country in the entire world. IGT (Impaired Glucose Tolerance) is also a mounting problem in India.

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The prevalence of IGT is thought to be around 8.7 per cent in urban areas and 7.9 per cent in rural Areas, although this estimate may be too high. It is thought that around 35 per cent of IGT sufferers go on to develop type 2 diabetes, so India is genuinely facing a healthcare crisis. In India, the type of diabetes differs considerably from that in the Western world. Type 1 is considerably rarer, and only about 1/3 of type II diabetics are overweight or obese. Diabetes is also beginning to appear much earlier in life in India, meaning that chronic long-term complications are becoming more common. The implications for the Indian healthcare system are enormous.

2 Aim of the study

The main objective of this study is to provide a comprehensive overview of the situation regarding yoga for diabetes mellitus, and explore the possible strategies that could be effective in combating the spread and focus for healthy life.

3 Diabetes

Diabetes is first recorded in English, in the form diabetes, in a medical text written around 1425. In 1675, Thomas Willis added the word mellitus, from the Latin meaning "honey", a reference to the sweet taste of the urine. This sweet taste had been noticed in urine by the ancient Greeks, Chinese, Egyptians, Indians, and Persians (http://en.wikipedia.org/wiki/Diabetes_mellitus). In 1776, Matthew Dobson confirmed that the sweet taste was because of an excess of a kind of sugar in the urine and blood of people with diabetes (Dobson, 1776) [5]. Diabetes mellitus is a metabolic disease in which the primary problem is the defective utilization of sugar by the body. Glucose metabolism is under the control of the hormone insulin. This is secreted by the pancreas, a large gland behind the stomach. When this gland becomes stressed or exhausted, the hormone insulin becomes deficient in quantity or sensitivity and the blood sugar level becomes high and uncontrolled as a result. The symptoms of diabetes are due to excessive sugar in the blood. Diabetes is a condition when the pancreas in the human body fails to produce insulin. Incidentally, insulin is the hormone that converts the sugar in the food into energy. Insufficient secretion of insulin by pancreas results in excess glucose level in the bloodstream, resulting in diabetes. The blood glucose is required to be used up to provide energy and fuel to the body, in order to do its work. If the level of glucose is high, it eventually affects the body parts.

A person suffering from diabetes portrays symptoms, which could be fatigue, hazy vision, excessive thirst, weight loss and an increase in appetite.

4 Type of diabetes

There are three main types of diabetes.

1. Type I Diabetes -Insulin dependent Diabetes mellitus (IDDM) or juvenile diabetes or childhood-onset diabetes,
2. Type II Diabetes-Non Insulin dependent Diabetes mellitus (NIDDM) or Maturity onset / adult-onset diabetes, obesity-related diabetes,
3. Type III Diabetes -Gestational Diabetes mellitus (GDM) – that starts during pregnancy

4.1 Type I Diabetes

Type 1 diabetes mellitus is characterized by loss of the insulin-producing beta cells of the islets of Langerhans in the pancreas leading to insulin deficiency. This type of diabetes can be further classified as immune-mediated or idiopathic. The majority of type 1 diabetes is of the immune-mediated nature,

where beta cell loss is a T-cell mediated autoimmune attack (Rother, 2007) [20]. There is no known preventive measure against type 1 diabetes, which causes approximately 10% of diabetes mellitus cases in North America and Europe. Most affected people are otherwise healthy and of a healthy weight when onset occurs. Sensitivity and responsiveness to insulin are usually normal, especially in the early stages. Type 1 diabetes can affect children or adults, but was traditionally termed "juvenile diabetes" because it represents a majority of the diabetes cases in children.

4.2 Type II Diabetes

Type 2 diabetes mellitus is characterized by insulin resistance which may be combined with relatively reduced insulin secretion. The defective responsiveness of body tissues to insulin is believed to involve the insulin receptor. However, the specific defects are not known. Diabetes mellitus due to a known defect is classified separately. Type 2 diabetes is the most common type.

In the early stage of type 2 diabetes, the predominant abnormality is reduced insulin sensitivity. At this stage hyperglycemia can be reversed by a variety of measures and medications that improve insulin sensitivity or reduce glucose production by the liver. As the disease progresses, the impairment of insulin secretion occurs, and therapeutic replacement of insulin may sometimes become necessary in certain patients.

4.3 Gestational Diabetes mellitus (GDM)

Gestational diabetes is diabetes that is found for the first time when a woman is pregnant. It is believed that the hormones produced during pregnancy reduce a woman's receptivity to insulin, leading to high blood sugar levels. It resembles type 2 diabetes in several respects, involving a combination of relatively inadequate insulin secretion and responsiveness. It occurs in about 2%–5% of all pregnancies and may improve or disappear after delivery. Gestational diabetes is fully treatable but requires careful medical supervision throughout the pregnancy. About 20%–50% of affected women develop type 2 diabetes later in life.

Even though it may be transient, untreated gestational diabetes can damage the health of the fetus or mother. Risks to the baby include macrosomia (high birth weight), congenital cardiac and central nervous system anomalies, and skeletal muscle malformations. Increased fetal insulin may inhibit fetal surfactant production and cause respiratory distress syndrome. Hyperbilirubinemia may result from red blood cell destruction. In severe cases, perinatal death may occur, most commonly as a result of poor placental perfusion due to vascular impairment. Labor induction may be indicated with decreased placental function. A cesarean section may be performed if there is marked fetal distress or an increased risk of injury associated with macrosomia, such as shoulder dystocia.

5 Yoga

In the present time, more and more people, especially the westerners are resorting to yoga to find cure for chronic health problems and attain a peace of mind. Yoga is one of the six schools of Indian philosophy and is also part of Ayurveda, which is an Indian traditional medical system (Birch, 1995) [2]. Health is promoted by seeking balance between the physical, spiritual, psychological, and social aspects (Engelbreton, 2002) [6]. Yoga is an ancient art on a harmonizing system of development for the body, mind and spirit. The word yoga derived from the Sanskrit term "Yuj" which means 'to join',

‘to yoke’ or ‘to bind’ and attach. It also means union or communion. So the word yoga means union of body, mind and emotions. Patanjali defined the word of yoga means “Yoga chitha Viruthi Nirothga”

Many styles of yoga are based on the eight-fold path outlined in Patanjali’s Yoga Sutras (Shearer, 2002). Also known as the eight limbs of yoga, the eight-fold path includes: attitudes toward others/restraints (yamas), rituals/ self-observances (niyamas), physical practice of postures (asana), breathing practice (pranayama), withdrawal of the senses (pratyahara), concentration (dharana), meditation (dhyana), state of enlightenment (samadhi) (Iyengar, 1979) ^[10].

6. Yoga Therapy

Yoga is a practical science, Indian Psychology with its ideology and technology: as a holistic system for promoting harmony of physical, mental, emotional, social and lastly at spiritual levels. When this balance is disturbed by accident, illness, disorder or the stress created by any illness: physical or mental. Yoga can help restore it, and help cure or manage the illness. Yoga therapy is the adaptation of yoga practices for people with health problems. It is a tool to attain the integration. Although ordinary yoga classes can improve general health and resolve mild complaints, but they may be ineffective or can be even harmful for serious conditions. In such cases, yoga therapy can help people by tailoring yoga life style to their individual needs, taking into account their health problems, flexibility, capacity, capability, habits, constitution and circumstances. (Bhatt, 2006)

Yoga therapy is the adaptation of yoga practices for people with health challenges. Yoga therapists prescribe specific regimens of postures, breathing, exercise and relaxation techniques to suit individual needs. Medical research shows that yoga therapy is among effective complementary therapies for several common ailments. The challenges may be an illness, a temporary condition like pregnancy or a chronic condition with old age or infirmity.

7 Yoga therapy for diabetes

7.1 Diet

Diet plays an important role in the management of diabetes as it exerts a direct influence on the blood glucose level. The goal of diet therapy is to maintain and prolong a healthy, productive and happy life. Regular small meals complex carbohydrates such as wheat, oatmeal, corn, brown rice and beans, avoid refined food stuffs, junk food simple sugars such as white sugar, honey glucose and sweets. Take lots of green vegetables salads, bitter melon. Maintain good hydration.

7.2 Suryanamaskar

Suryanamaskar is very good exercise for people suffering from diabetes, it increases the blood supply to various parts of the body, improving insulin administration in the body, it gives all the benefits of exercise if practiced at 3-6 rounds. One round of Suryanamaskar consists of twelve postures. It helps to burn out the excessive calorie. If practiced at slow speed, it offers the benefits of asana.

7.3 Asanas

Asanas are beneficial in the treatment of diabetes. Important aspect of Asanas is stability and comfort experienced in the position. After attaining the position, one needs to relax all the muscles and try to maintain the positions for long. Due to various twists, stretches and strains in the body, the internal organs are stretched and subjected to strain. This increases the

blood supply, oxygen supply to the organs, increasing the efficiency and functioning of the organ. Stretching various glands results in increased efficiency of the endocrine system.

7.3.1 Standing Asana - Tadasana, Ardhakatchakrasana, and Trikonasana.

7.3.2 Sitting Asana -Dandasana, Vajrasana, Baddhakonasana, Paschimottanasana, Ustrasana, gomukhasana, Ardha matsyendrasana, Janu Sirsasana, Mandukasana

7.3.3 Prone – Mandukasana, Bhujangasana, Salabhasana, Dhanurasana,

7.3.4 Supine – Navasana, Matsyasana, Suptaveerasana, Sarvangasana, Halasana, Savasana.

These asana have positive effect on pancreas and also insulin functioning. But to get this result, one needs to maintain the asana for a longer duration while relaxing the muscles.

7.4 Pranayama

One of the basic preparations for Pranayama is Nadi Shodhan Pranayama or alternate nostril breathing; this type is found useful in diabetes as Alternate nostril breathing has a calming effect on the nervous system, which reduces stress levels, helping in diabetes treatment. Also, research has shown that Bhramari and Bhastrika Pranayama help in diabetes. Bhramari has calming effect on mind, brain and nervous system. Bhastrika Pranayama is revitalizing Pranayama, which increases oxygen levels and reduces carbon dioxide levels in the blood. In Bhastrika Pranayama, the abdominal muscles and diaphragm are used which puts pressure on the internal organs. But before practicing these Pranayama, one must learn and practice deep breathing, fast breathing, alternate nostril breathing, Bandhas (Jalandhar bandha or chin lock, moola bandha and Uddiyan bandha or abdominal lock) from expert Guru.

Note – Pranayama should be practiced under the expert guidance of Yoga Guru.

7.5 Meditation

Meditation is an important part of yoga practice. As much as stretching and moving help the body rest and rejuvenate, meditation is a healing balm for brain chemistry, helping to bring the mind to a state of awakened calm. Meditation and breath techniques are being studied by scientists to discover how they work in helping people relax and lift their spirits. The meditations in Kundalini Yoga are described as benefiting the brain chemistry, the hormonal balance, and the stimulation of communication between the brain hemispheres. (Khalsa, 2004) ^[11].

Practice of meditation is especially useful in the management of stress. Relaxed and Concentrated state of mind is the aim of any form of meditation which creates a calming effect on the nervous system, brings balance between Sympathetic and Parasympathetic nervous systems. Initially meditation may be difficult, and one can practice Omkar Chanting, concentration on breathing. Especially for diabetes, concentration on pancreas during the meditation practice has shown positive effects on sugar levels. One can even visualize the proper functioning of the pancreas, proper insulin administration in the body can help in the treatment of diabetes.

7.6 Mudra -Yoga Element (Fingers)

Thumb – Fire “Angustha”,

Index – Air “Tarjani”,

Middle – sky “Madhyama”,

Ring – Prithivi (earth) “Anamika”

Little – Water “Kanishtha”

Chin Mudra, Pankaj Mudra, Apana Mudra, Varuna Mudra, Vayu Mudra, Linga Mudra, Sangu Mudra, Yoga Mudra.

7.7 Yoga Nidra

Yoga Nidra is a very important process of deep relaxation; it helps alleviate the stress and has very good positive effects on the entire body – mind complex.

7.8 Cleansing Processes

Master cleansing or Shankha Prakshalana is recommended for diabetes, complete Shankha Prakshalana takes 1 day and is recommended once in 6 months, but smaller version of it can be done 3 times a week. This process cleanses the Gastro Intestinal tract completely. This process is done by drinking 2 glasses of warm, salty water and lemon juice is added to it. Then performing 6 different exercises, these exercises speed up the peristaltic movements and one needs to evacuate bowels. In 2 hours about 7 to 8 bowels are completed till the clear water is evacuated.

Note- This is a process which is to be practiced only under the expert guidance and under observation of medical professionals. (Mandlik, 2008).

8 Discussion

India has a high prevalence of diabetes mellitus and the numbers are increasing at an alarming rate. In India alone, diabetes is expected to increase from 40.6 million in 2006 to 79.4 million by 2030. Studies have shown that the prevalence of diabetes in urban Indian adults is about 12.1%, the onset of which is about a decade earlier than their western counterparts and the prevalence of Type 2 diabetes is 4-6 times higher in urban than in rural areas (Mehta, 2009-Abstract) [14, 15]

Many studies have reported the beneficial effect of the practice of yoga on diabetes. (Desai, 1985, Divekar and Bhat. 1981, Koshti *et al.*, 1972, Mohammad U. *et al.*, Patel, 1973, Sahay, *et al.* 1984, Tulpule, 1977, Udupa, Ramaiah, 1986) [3, 4, 13, 16, 17, 22, 23, 24, 19]. Some studies have mentioned up to 65 percent beneficial effect of yogic therapy for diabetes. Udupa has even mentioned 5 cases of juvenile diabetes that were completely controlled by yogic treatment. All of these studies have emphasized the possible mechanism of the yogic practices as:

1. Direct influence on pancreatic secretion by rejuvenation of the pancreatic cells, through alternate abdominal contractions and relaxation, during asanas (yogic postures which produce relaxation) and breathing exercises.

2. Reduction in blood sugar due to muscular exercise involved in the asanas.

Meditation may modulate limbic system activity, which via the hypothalamus may modulate sympathetic nervous system activity and regulate endocrine secretions. Conditioning of these regions by practice of meditation may help in maintaining the normal homeostatic conditions. The fundamental effect of stress reduction may be an important factor contributing to seizure reduction and EEG changes (Yardi, 2001) [25].

It is beyond doubt that India has the largest number of diabetics in the world and the Government of India has rightly launched the national programme for control of diabetes, cardiovascular diseases and stroke in January 2008

(<http://www.diabetesmoz/2008/01>). The responsibility of keeping our present as well as future race free from preventable diseases like diabetes, hypertension and CHD lies on each and every one of us. Hence intervention strategies like “Eat less, Eat on time and Walk more” have to be inculcated to save our children and youth from developing these present day disorders.

9 Conclusion

Western medical research has focused upon diabetes as only a physical disorder, requiring only physical modalities of intervention. It has been able to confirm that regular physical exercise does have some beneficial effects in diabetics of both types, and that in those who are genetically predisposed to type II; it could prevent its development. Western studies have recommended exercise of moderate intensity, as a means to adopt a regular diet and insulin dosage, or to control body weight and improve circulation.

Research in India has recognized it as a psychosomatic disorder with causative factors being sedentary habits, physical, emotional and mental stress. Many studies there have confirmed that the practice of the postures can rejuvenate the insulin producing cells in the pancreas of diabetics of both types, and that doing the postures in a relaxed manner, without exertion, yogic meditation and breathing help most patients to control the causes of diabetes.

The practice of yoga regulates body physiology through control of posture, breathing, and meditation. Hence, Yoga helps in enhancing health and sense of well-being. There are several asana suggested in Yoga that actively works upon the human body to help to achieve a perfect balance between body requirements and energy produced. By balancing the hormonal production and organ functioning, yoga helps in healing several diseases and optimum healthy life.

Hence it has been concluded that Yoga cannot “cure” diabetes, but there are several ways yoga can be beneficial in controlling diabetes. If medically prescribed regimens are followed by diabetic patient, they can safely add yoga to their treatment. Due to the potential impact on their glucose levels, and overall body function, great strides can be made through regular committed yoga practice.

Therefore, regular practice of yoga may prevent and control the status of diabetes mellitus and produce optimum healthy population.

10 Implication

Various controlled studies (Funderburk, 1977, Peo Medical and Psychological Scientific Research on Yoga and Meditation. 1979, Bhole, 1985 and 1988) [7, 18, 1] have shown objective alterations due to yoga in:

- The musculo-skeletal system—changes in muscular activity, reflex activity, flexibility and pressure changes in body cavities,
- The respiratory system—changes in diaphragmatic breathing, nostril dominance, force of breathing, breath holding time, tidal volume minute ventilation and vital capacity, metabolic rates—basal metabolic rate and oxygen consumption,
- The cardiovascular system—regional blood flows, heart rate, blood pressure, sinus bradycardia, nodal rhythms and increased physical work capacity for heart rate,
- Enzyme and hormone levels—biochemical changes, e.g. regarding catecholamine, histamine, 17-hydroxy steroids, vanilylmandelic acid, and plasma acetylcholine.

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