Section: Research Paper

A Detailed Overview on the Effect of Yoga on Diabetes and Potential Benefits of Yoga

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Abstract: Yoga is a method for balancing and harmonising the body, mind, and emotions. Yoga has its roots in India and has been practised for more than 5,000 years. Yoga is a mind-body discipline that combines physical poses, breathing techniques, and meditation, all of which have been shown to improve a range of medical issues such as diabetes, stress and other issues. Including diabetes mellitus, yoga has become a well-liked alternative therapy for a number of chronic illnesses. Type 2 diabetes and other lifestyle disorders can be managed with the help of yoga. The therapeutic effects of yoga on diabetes involve immunological, neuroendocrine, and psycho-neuro-endocrine systems. Yoga practise integrated into daily life helps diabetics achieve glycemic control and lowers their risk of complications. Based on data from numerous clinical trials, the function of different yoga practises in the treatment of diabetes has been presented in this article. This article tries to give a summary of the research on yoga's possible health benefits for people with diabetes and its influence on diabetes management.

Keywords: Yoga, Diabetes, Diabetes Management, Yoga Benefits

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Introduction

Millions of individuals worldwide suffer from diabetes, which is a chronic disorder whose prevalence is rising quickly. It is a metabolic condition that makes it difficult for the body to digest glucose, which raises blood sugar levels. Diabetes must be managed using a complex strategy that includes dietary changes, medication, and blood sugar monitoring. Yoga and other alternative therapies have received more attention recently for their potential use in the treatment of diabetes. This study tries to summarise and analyse the results of several research that looked into the effects of yoga on diabetes treatment.

Yoga intervention significantly reduced fasting blood glucose, HbA1c, and lipid profile compared to usual care or no intervention, according to a comprehensive review and meta-analysis of 12 randomised controlled trials (RCTs) encompassing 864 patients with type 2 diabetes [1]. Yoga intervention significantly decreased fasting blood glucose, HbA1c, and lipid profile, according to another comprehensive review and meta-analysis of 25 RCTs encompassing

1743 patients with type 2 diabetes [2]. A 12-week yoga intervention, compared to a control group, significantly reduced fasting blood glucose, HbA1c, and lipid profile, according to a randomised controlled trial involving 123 individuals with type 2 diabetes [3]. A 16-week yoga intervention significantly improved fasting blood glucose, insulin resistance, and quality of life when compared to a control group, according to another randomised controlled research including 30 patients with type 2 diabetes [4]. A 12-week yoga intervention, compared to a control group, significantly increased insulin sensitivity and beta-cell activity, according to a randomised controlled trial including 60 patients with type 2 diabetes [5]. Another randomised controlled trial with 47 type 2 diabetic patients discovered that a 3-month yoga intervention significantly enhanced lipid profile, quality of life, and insulin sensitivity when compared to a control group [6].

Balaji P. A et al investigated the possible advantages of yoga for the control of diabetes. The authors looked at the research on yoga's impact on glycemic control, insulin resistance, and other outcomes associated with diabetes and discovered that it might be a useful adjunct therapy for diabetes management [7]. Malhotra V et al looked into how yoga affected type 2 diabetes patients' glucose control and other outcomes connected to the disease. According to authors, a 3-month yoga intervention significantly lowered glycated haemoglobin (HbA1c) levels and fasting blood glucose levels when compared to a control group [8].

Vahdatpour et al. looked into how a 12-week yoga intervention affected individuals with type 2 diabetes' blood sugar levels and cardiovascular markers. In comparison to a control group, the study found that yoga dramatically lowered fasting blood glucose levels and improved cardiovascular measures like blood pressure and heart rate variability [9]. A non-randomized study (NRS) examined the impact of a 6-months yoga intervention on type 2 diabetes patients' blood glucose levels. In comparison to a control group, the study found that yoga dramatically decreased fasting blood glucose levels and enhanced glycemic control [10].

The foundation of yoga is the idea that the body and mind are inextricably linked. Usually, Flexibility, muscle strength, blood flow, and oxygen consumption are improved using Yoga [11]. Numerous health advantages of yoga include increased self-awareness, relaxation, and physical fitness. Given acceptable high levels of adherence, yoga can be used to effectively treat a variety of lifestyle conditions, including diabetes. Yoga helps people become more disciplined with their eating and exercising, which help to change the patient-related resistance that leads to exercise being underutilised as a therapeutic tool [12].

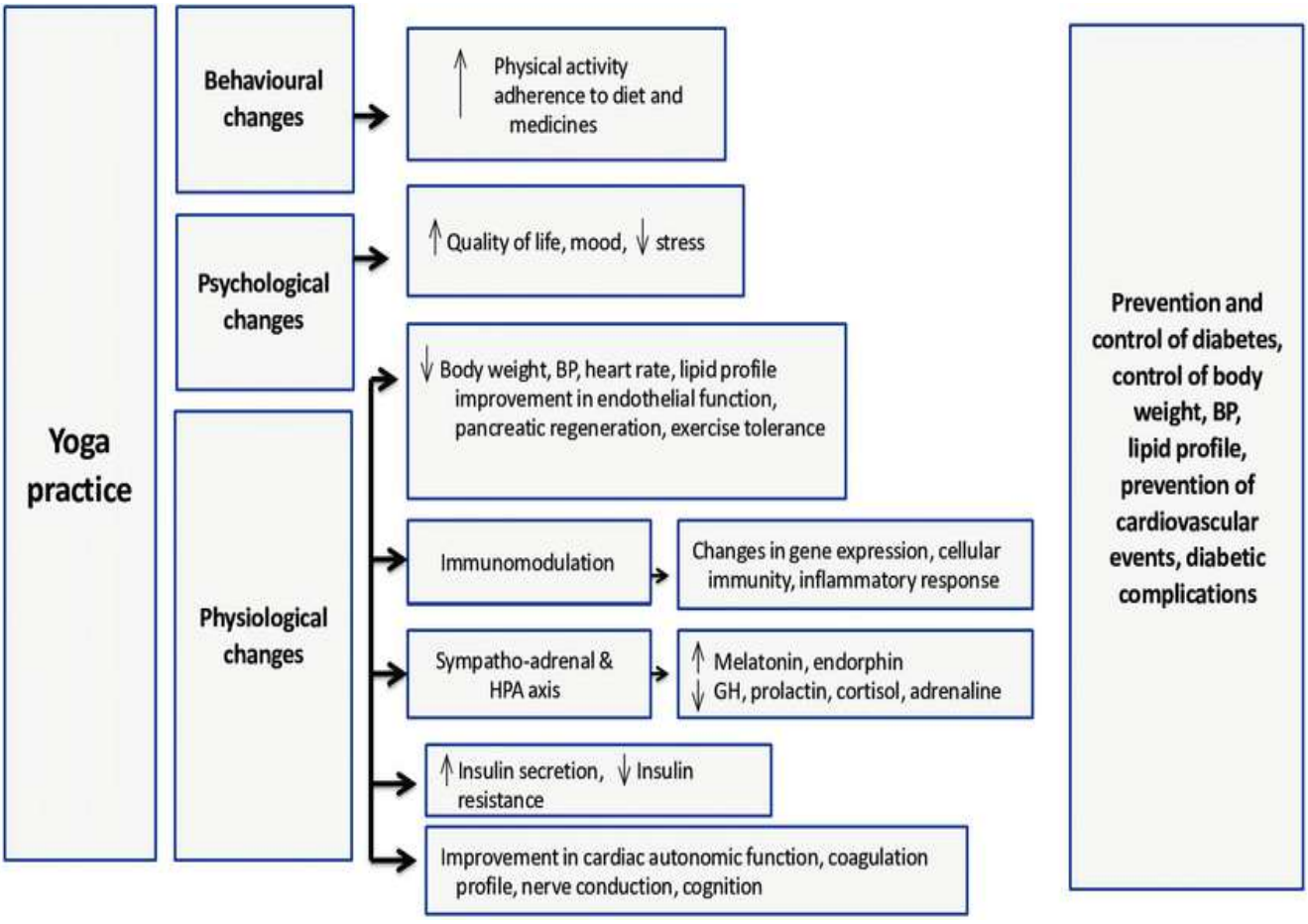
Yoga effectively lowers stress, which aids in the management of diabetes [13]. Yoga practise was found to improve physical, psychological, and social aspects as well as overall quality of life in healthy volunteers [14-15]. It was also found to increase wellness, reduce stress, depression, and anxiety. The findings of many psychological tests, such as satisfaction impact and worry, improve significantly after practising yoga [16]. In addition to its effects on relaxation and stress management, yoga also improves physical activity, behaviour, and nutritional practises [12]. Diabetes is a long-term metabolic condition that has a negative impact on quality of life. The regulation of diabetes is influenced in both directions by psychological stress and depressive

mood [17]. Yoga lowers oxidative stress, as shown by improvements in adiponectin levels and decreases in leptin, interleukin 6, and malondialdehyde serum levels [18, 19]. Diabetes patients who receive yoga therapy have more insulin receptors and more receptors that are bound to other molecules [49]. Lung function tests have been observed to improve with yoga and different breathing techniques [52].

Potential benefits of Yoga

Due to its many health advantages, yoga, an ancient practise with its roots in India, has gained appeal on a global scale. One of yoga's many advantages is its potential to manage and prevent a number of illnesses, including diabetes. Here are a few ways that yoga might help people with diabetes and other illnesses:

- **Decreases stress:** Yoga helps people with diabetes lower their stress levels, which is advantageous because stress can raise blood sugar levels. People with other illnesses, such as cardiovascular disease and hypertension, can also benefit from stress reduction.
- **Lowers blood sugar levels:** According to certain research, people with diabetes who practise yoga had lower blood sugar levels overall. This is because yoga enhances glucose metabolism and insulin sensitivity, both of which can help control blood sugar levels.



Benefts of Yoga in Managing Diabetes [22, 23]

- **Yoga enhances cardiovascular health:** Studies have shown that practising yoga lowers blood pressure, lowers cholesterol, and enhances circulation. As people with diabetes are more likely to develop cardiovascular disease, this is advantageous for them.
- **Boosts immune function:** Practicing yoga can help boost immune function, which can be beneficial for individuals with diseases such as HIV/AIDS, cancer, and autoimmune diseases.
- **Improves balance and flexibility:** Yoga helps people become more flexible and balanced, which is advantageous for those who suffer from conditions like osteoporosis and arthritis.
- **Encourages general well-being:** Yoga helps people feel better physically and mentally, which can help those who have a range of ailments by easing their symptoms like pain, weariness, and depression.

In summary, people with diabetes and other conditions can benefit greatly by practising yoga. However, it's crucial to speak with a doctor before beginning a yoga practise, especially if you have a health issue.

Yoga Methods for Controlling Diabetes

Given that it has been demonstrated to help lower blood glucose levels, enhance insulin sensitivity, and reduce stress levels, yoga can be a beneficial adjunct therapy for people with diabetes. Here are some yoga techniques that could help manage diabetes:

- **Sun Salutations:** "Sun Salutations" combine inversions, forward and backward bends, and other movements. Sun salutations can aid to boost insulin sensitivity, the digestive system's activity, and circulation.
- **Breathing Exercises:** Pranayama, a type of yoga breathing technique, can help lower blood pressure and reduce stress, both of which can enhance insulin sensitivity and blood glucose levels.
- **Yoga Nidra**: Yoga Nidra is a relaxation technique that entails lying down in a comfortable position while concentrating on breathing exercises and guided imagery. It can aid in calming the mind and encouraging relaxation, both of which can benefit blood sugar levels.
- **Asanas:** The sitting forward bend and the spinal twist is two examples of asanas that can activate the pancreas and control blood sugar levels. Additionally, these positions enhance circulation, digestion, and general health.
- **Meditation:** Engaging in meditation can help people with diabetes feel more relaxed and enhance their general health. Additionally, studies have indicated that meditation increases insulin sensitivity and lowers blood glucose levels.

It's critical to keep in mind that yoga should be used in conjunction with medical care, not as a replacement. Before beginning a new workout or yoga practise, people with diabetes should always check with their doctor.

Conclusion

The available literature suggests that yoga intervention can significantly improve glycemic control, lipid profile, insulin sensitivity, and quality of life in patients with type 1 and type 2 diabetes. However, further well-designed and larger-scale studies are needed to confirm these

findings and determine the optimal type, duration, and frequency of yoga intervention for diabetes management. In individuals with type 2 diabetes, the analysis discovered, yoga-based programmes were linked to appreciable improvements in glycemic management, lipid profile, and blood pressure. Yoga can be an effective technique for people with diabetes to control their disease and enhance their quality of life with frequent practise.

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