

Effective management of type 2 DM in India: Looking at low-cost adjunctive therapy

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ABSTRACT

The prevalence of Diabetes is projected to increase to 80 million by 2030, placing an immense burden on the health care resources of our country. Thus, diabetes poses a challenge to health systems and the individual. Hence, it is necessary to look at adjuncts to effective management of Diabetes; adjuncts which are not resource intensive and are nearer to the community that people live in. Yoga holds promise as a therapeutic intervention and health promotion measure. This brief communication explores the studies done to date on the beneficial effects of Yoga on Diabetes.

Key words: Diabetes, adjuncts, Yoga

THE INCREASING BURDEN OF DIABETES

The prevalence of type 2 diabetes has increased rapidly. In India, 30 million people have diabetes and this is expected to increase to nearly 60 million by 2017.^[1] Given India's limited resources, it is important for health policy makers to choose from the ever-widening list of health conditions that vie for attention, and it is a list to which diabetes must be added as an important public health problem. However, these dilemmas of choice are made even more difficult when policy makers have to prioritize on the basis of disease burden, cost-effectiveness, and equity.^[2] In this light, the landmark U.N general assembly in 2011 met to discuss the prevention and control of non-communicable diseases (NCD). It was pointed out that non-communicable diseases are responsible for more deaths than all other causes. While the international community had traditionally focused on communicable diseases, the NCD –cardiovascular disease, diabetes,

cancers, and other chronic respiratory diseases emerged, almost unnoticed, in the developing world.^[3] With this ever-increasing prevalence of obesity, diabetes, and coronary disease, it is likely that health policy-makers would assign an increasing proportion of funds to chronic diseases in the years to come. The current global economic uncertainties can make the situation worse. Thus, the onus might be on optimizing the utilization of these funds for the best possible public health outcome. It is in this light, that we write this commentary on a simple, cost-effective strategy for preventing diabetes – Yoga therapy.

THE CHALLENGES OF DIABETES MANAGEMENT

The management of diabetes poses unique challenges in terms of modification of dietary practices, weight management, exercise, monitoring of body fluids (blood, urine), footcare, use of drugs, and learning new technical skills such as blood glucose monitoring. Health care systems need to be redesigned to deliver chronic care that is founded on existing primary care facilities, but supported by good referral systems.^[2] Inaction will affect millions of lives—often the lives of those who have the least.^[4] To deal with the increasing morbidity and mortality, it is important to develop and evaluate low-cost strategies that build on available resources, and especially, interventions that can

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empower patients.^[5] The prevalence of diabetes mellitus in India is projected to increase by 60% and the economic burden by 50% over the same period.^[6] These numbers are overwhelming, and it may be pertinent to point out that highly successful, evaluated, prevention programs have depended on highly resource-intensive behavior change techniques that would be extremely costly if rolled out universally and would bankrupt the wealthiest of nations.^[6] Evidence from randomized controlled trials (RCT's) have already shown the usefulness, though expensive nature of carrying out lifestyle intervention programs.^[6]

LOW COST ALTERNATIVE: YOGA

Today, it is necessary to look at alternatives which are not resource-intensive and those which are nearer to the community that people live in. Yoga therapy holds promise as a therapeutic intervention and health promotion measure, though studies are not conclusive. A recent randomized controlled study conducted in India also showed a significant improvement in the quality of life but a non-significant trend towards improvement in glycemic control in the intervention group.^[7] The advantages of yoga are that, it is a holistic philosophy, in which physical exercises are linked to a wider lifestyle and behavioral change that includes diet, relaxation, and stress management. It also imposes low cardiovascular demands, making it heart-friendly.^[8] It is also considered to be a potential therapeutic tool to achieve positive health and cure disease.^[9]

YOGA: MORE THAN JUST EXERCISE

About 80% of people with diabetes live in the developing countries. Yet, 80% of the expenditure on medical care for diabetes is made by the richest countries of the world.^[10] A study on determinants of medical outcomes showed that patient-related reasons were more responsible for variability in HbA1c when compared with physician-related factors.^[11] Controlling these patient-related factors hold the key to successful control.

According to the American Diabetes Association guidelines regular, moderate intensity cardiovascular exercise training of at least 150 min/week, alone or in conjunction with resistance exercise training 3 times per week, has been shown to improve glucose control and glucose disposal, improve insulin sensitivity, contribute to weight loss.^[12] Though regular exercise training is a cornerstone of complementary therapy, it is frequently underutilized as a treatment strategy for the prevention and treatment diabetes.^[13] In this context, the importance of yoga is related to the ease of use, safety, and multiple psychological benefits including stress reduction and mental health well being.

There have been at least 22 RCT studying the risk factors of developing type 2 diabetes with some evidence that the regular practice of yoga over 3-6 months can decrease the risk of developing diabetes and improve glucose control in healthy adults.^[13] The postulates on the efficacy of yogic practices in controlling diabetes is based on the exercise effect, changes in biochemical and hormonal profile, elimination of stress, and instilling a sense of discipline.^[9] If the patient-related reasons like discipline regarding food and exercise can be taken care of and added to this, if there is a positive effect on the biochemical and hormonal profile, it can help to modify the patient-related reasons and result in a better outcome for the patient with diabetes.

Thus, yoga-based programs may be a low-cost intervention strategy to improve physical as well as psychological well being. Yoga provides slow rhythmic movements, which emphasize the stimulation of the organs and glands by easy bending and extension, which do not over-stimulate muscles but concentrate on focused stimulation.^[14] Yoga could be a useful strategy to target the insulin resistance syndrome. The insulin resistance syndrome or metabolic syndrome is a constellation of hyperglycemia, dyslipidemia, hypertension, and central obesity. Increased sympathetic activity, enhanced cardiovascular reactivity, and reduced parasympathetic tone have been implicated in the pathogenesis of insulin resistance syndrome.^[15] Recent research also shows that chronic psychological stress and negative affective states contribute to the pathogenesis and progression of insulin resistance, glucose intolerance, hypertension, and other IRS-related conditions.^[8]

Studies have shown that yoga has a positive short-term effect on multiple diabetes-related outcomes, but its long-term effects are not clear. Yoga is an innovative form of physical activity and stress management. This is increasingly becoming popular. In a nationwide survey in the US, 7.5% had practiced yoga at some point and very interestingly, 90% of this population expressed the belief that yoga was helpful in improving, maintaining health or both.^[16]

YOGA IN INDIA

Though yoga originated in India, extensive RCT-based data are not available for our country. While there are many studies on yoga from India, the studies do have limitations: Lack of control groups, reduced power because of a low number of study subjects, possible selection bias or influence of uncontrolled confounding, lack of appropriate statistical analyzes or presentation.^[8,17] Additional studies using rigorous methodologies are necessary to examine the effects of yoga therapy on glycemic control, and quality of life of women with type 2 diabetes mellitus.

A randomized study done in India found a significant improvement in fasting blood sugar, HbA1c, and total cholesterol with yoga therapy. Significant improvements in scores of psychological assessment (satisfaction, impact, and worry) were also seen. Clinically significant reduction in the doses of hypoglycemic agents and insulin were observed after yoga lifestyle intervention.^[18] Another study (a more rigorous, inpatient yoga treatment accompanied by visceral cleansing procedures, in addition to *Asanas* and *Pranayama*) was undergone by 149 patients for 40 days. This study showed that, for type 2 diabetes of less than 10 yrs duration and fasting glucose <140 mg/dl, hyperglycemia can be controlled by yoga alone. However, patients with very severe hyperglycemia/glucose intolerance would need a combination of yoga and hypoglycemic drugs.^[19] Bijlani, *et al.*, within a short period of study for 10 days was able to show a significant reduction in fasting glucose, total cholesterol, LDL, VLDL, total cholesterol/HDL ratio with yoga therapy; these were more marked in those with hypercholesterolemia and hyperglycemia.^[20] In addition to reporting a fall in fasting glucose and post-meal blood glucose, Malhotra, *et al.* also reported a significant fall in waist-hip ratio and changes in insulin levels, suggesting a re-distribution of fat and glucose utilization.^[21] Even in healthy young subjects, higher insulin levels were reported after yogic postures.^[22] Another study showed a significant decrease in BMI and anxiety and an increase in general well-being.^[23]

YOGA OUTSIDE INDIA

Yoga has been studied by researchers outside India as well. A randomized trial conducted in UK found a significant improvement in the yoga group for HbA1c, fasting glucose, LDL, and total cholesterol.^[24] They concluded that traditional i.e., primarily yoga-based interventions may benefit patients with higher HbA1c values. However, there are conflicting reports too- In an exploratory RCT in UK, yoga did not show a dramatic benefit. In the intervention group, the HbA1c fell only slightly from 7.06 to 6.86% immediately.^[14] However, it was also suggested that some other factors like good background control in the targeted population (mean HbA1c-6.9), small sample size, practical and motivational barriers to class attendance, physical and motivational barriers to engaging in exercise could be responsible for the marginal fall in HbA1c. In a systematic review, Innes, *et al.* suggested that yoga may be instrumental in improving core indices of the metabolic syndrome including glucose tolerance and insulin sensitivity, lipid profiles, anthropometric characteristics.^[8] Patients in studies have shown improvement in glycemic control with reduction in dose requirement of oral hypoglycemics. Among a small

number of elderly, followed up for 7 years, there was good glycemic control and no long-term complications were reported in them.^[9]

Are there studies which have been carried out to ascertain the reasons for the benefit that yoga offers in the setting of type 2 diabetes/metabolic syndrome? Interestingly, some studies do suggest that yoga may protect against oxidant stress. Oxidative stress has been linked to diabetes and its complications in several reports.^[25,26] Gordon, *et al.* conducted a prospective randomized study for 6 months on the effects of physical exercise and yoga therapy on oxidative stress indicators.^[27] Fasting blood glucose decreased significantly, as did markers of oxidative stress; anti-oxidant molecules showed a significant increase. In a controlled trial conducted in India on oxidative stress indicators like malonyl aldehyde, yoga practitioners achieved significant improvement in BMI, fasting glucose, post-meal glucose, malonyl aldehyde, glutathione, and vitamin C, and no adverse events were reported during this period.^[28] This effect of yoga intervention was more pronounced in patients with poor glycemic control.

CONCLUSION

Thus, we suggest that yoga be considered as a candidate for community-based management programs in tackling the burden of type 2 diabetes. Yoga is a potential intervention that is not resource-intensive. If studies prove the effectiveness of yoga, the future may see the emergence of a “Yoga movement by the people with diabetes” to generate positive health. And finally, yoga, an innovation created in India, could find its way back to pre-eminence in this country, given its potential in the ever-increasing epidemic of diabetes and cardiovascular disease.

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