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Yoga based lifestyle for type 2 diabetes: need for a nationwide movement to control type 2 diabetes

Abstract

Prevalence of type 2 diabetes mellitus (T2DM) is reaching epidemic proportions, more so, in developing countries like India. Trends show that, if unaddressed, diabetes will become a major killer and major hindrance for socio-economic development of a nation. India is fast marching forward to become the diabetes capital of the world. T2DM is a multi-factorial lifestyle related illness where risk factors emerge from an unregulated lifestyle. Stress and depression are also major contributors towards its higher prevalence and complications. Yoga based lifestyle (YBL) is a holistic multi-dimensional mind-body approach of dealing with this complex problem. As demonstrated by number of randomized controlled trials, systematic reviews and recent meta-analyses, it has the potential as an adjuvant for enhancing primordial, primary, secondary and tertiary prevention of T2DM. Hence, it is the need of the hour that awareness about YBL for T2DM is spread through a nationwide diabetes control movement through Yoga, in India.

Keywords: type 2 diabetes mellitus (T2DM), yoga based lifestyle (YBL), movement, stress, depression

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Nagarathna Raghuram,[1] Hemant Bhargav,[2] Nagendra HR[3]

[1]Medical Director and Director of Stop Diabetes Movement Program, VYASA, Bangalore, India
[2]S-VYASA Yoga University, Bangalore, India
[3]S-VYASA Yoga University, Bangalore, India

Correspondence: Nagarathna Raghuram, Medical Director and Director of Stop Diabetes Movement Program, Vivekananda Yoga Anusandhana Samsthana, Bangalore, India, Tel +91 9845088086, Email rnagaratta@gmail.com

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Introduction

Type 2 Diabetes Mellitus (T2DM) has become a global threat. In 2010, prevalence of T2DM worldwide among adults was 6.4% and it is estimated that by 2030 it will increase by 7.7%. By 2030, diabetes will be affecting approximately 439 million people. In this gap of 20 years (2010 to 2030), the increase will be 69% in developing countries and 20% in developed countries. In fact, the problem is worsening faster than expected, in 2000, the projected figure for 2030 was 366 million,[1] and by 2010, the figure has already reached 439 millions. It is now established from epidemiological studies in Asia that approximately 15 percent or 1 in 7 adults has either increased fasting glucose or impaired glucose tolerance based on the WHO criteria,[2,3] of which an estimated 5 to 12 per cent develop Type 2 diabetes annuall.[3,4] In 2004, an estimated 3.4 million people died from consequences of high fasting blood sugar,[5] and more than 80% of diabetes deaths occur in low- and middle-income countries.[6] Moreover, WHO projects that diabetes will be the 7th leading cause of death globally in 2030.[7]

India may become diabetic capital of the world

India is threatened with the epidemic of Type 2 Diabetes Mellitus (T2DM) with second largest number (>61 million) of diabetics, expected to double by 2030.[8] Alarming things are, T2DM is increasing in rural India too,[9] and its onset is shifting to younger age.[10] Due to unhealthy lifestyle,[11] a large proportion of the population is at "high risk" of progression to T2DM,[12] which indicates a huge burden on nation's health and economy in near future. The national T2DM prevalence in 2011 was already 8.3 percent.[12] In 2006, diabetic population in India was 40.9 million and it is estimated to be 69.9 in 2025 and 80 million in 2030. These observations, together with the high rates of complications and mortality,[13] associated with T2DM, demonstrate that diabetes prevention is an urgent priority for the government and other organizations in India.

Diabetes as lifestyle disorder and need for lifestyle intervention

In spite of great technological advancement and spending millions of dollars in research to develop drugs for the management, it has not been possible to reduce the rising trend in incidence of diabetes type 2 and morbidity and mortality associated with this health problem. Five classes of oral agents are approved for the treatment of diabetes. Oral therapy is indicated in any patients in whom diet and exercise fail to achieve acceptable glycaemic control. Although initial response may be good, oral hypoglycaemic drugs may lose their effectiveness in a significant percentage of patients. The drug categories include sulfonylureas, biguanides, alpha-glycosidase inhibitors, thiazolidinediones, and meglitinides. These drugs have various side effects e.g. sulfonylureas cause weight gain due to hyperinsulinemia,[14,15] biguanides cause weakness, fatigue, lactic acidosis; alpha glycosidase inhibitor may cause diarrhoea while thiazolidinediones may increase LDL-cholesterol levels. Weight gain and hypoglycemia are common side effects of insulin.[16,17] Vigorous insulin treatment may also carry an increased risk of atherogenesis.[17] Also, several studies have shown that intensive glycaemic control does not reduce the incidence of cardiovascular events or mortality.[18] Although the reasons are unclear, ACCORD (Action to Control Cardiovascular Risk in Diabetes) study showed increased mortality with very tight glycaemic control while ADVANCE (Action in Diabetes and Vascular Disease: Preterax and Diamicron MR Controlled Evaluation) and VADT (Veterans Affairs Diabetes Trial) studies have shown lack of benefit by use of drugs such as Preterax and Diamicron in reducing cardiovascular risk in diabetics.[19] Further, rising costs for drugs and investigations on a long term basis add to the financial burden which a large section of the community in India cannot afford.

Lifestyle intervention has been found to be efficacious, safe, and cost-effective method,[20] the major challenge is to translate lifestyle interventions into prevention programs at the national level,[21] for

which it is important to look at lifestyle interventions which are not resource-intensive and those which are nearer to the community that people live in India could relate to.[22]

Evidence for yoga based lifestyle in management and prevention of diabetes

Yoga is a traditional psychological, physical and spiritual regimen of Indian origin which fundamentally advocates an eco-friendly lifestyle for evolution into higher states of consciousness.[20,23] Yoga has been studied for several decades now for its role in the management of several chronic diseases including hypertension,[24] asthma,[25] obesity,[26] neuromuscular diseases,[27] psychiatric illnesses[28] and coronary artery disease.[29]

Yoga based life style intervention; an innovative form of psycho-physical activity with yoga based stress management strategies has become more useful today than ever. It can be considered the best intervention for community-based management programs in tackling the burden of type 2 diabetes in India,[22] as it has already shown its efficacy in different domains of T2DM.[30] Yoga is also easy and inexpensive to maintain, requiring little in the way of equipment or professional personnel, with some studies indicating excellent long-term adherence and benefits.[29–31] Table 1 summarizes the results of some of the important studies which have used yoga based lifestyle interventions.

Nationwide sdm (stop diabetes movement) or madhymeha mukta bharat (mmb) abhiyaan by vyasa in India

Inspired by these research data and the amazing results, Vivekananda Yoga Anusandhana Samsthana (VYASA) has undertaken an ambitious nationwide program, the SDM "Stop Diabetes Movement" to bring down the rising incidence of diabetes in India. Stop Diabetes Movement (SDM) is a community effort to prevent India from becoming the world capital of Diabetes Mellitus using the Integrated Approach of Yoga Therapy (IAYT).

VYASA, through its 30 years of continuous research has evolved Specific Integrated Yoga Therapy modules for chronic diseases based on intense search of the yogic literature that is being continuously updated based on the results after implementation of the modules. VYASA in its Arogyadhama (200 bedded residential integrative health center) through residential treatments has treated nearly 4 Lakh patients of Non-Communicable Diseases. Apart from the publications that provided the scientific evidence through RCTs,[20,23] The observations on large number of patients with T2DM who are able to get back their wellness (stop their insulin requirements, maintain their weight, better sleep, energy levels and quality of life) has been a rewarding experience at the Arogyadhama.

Madhumeha Mukta Bharat (MMB) is one of the important mission initiatives of VYASA Bengaluru, Technical support by S-VYASA Yoga University Supported by Arogya Bharati and Indian Yoga Association to spread awareness about diabetes and preventing diabetes among the Indians across the country for the well-being of the nation, using ancient holistic approach by Yoga. Madhumeha Mukta Bharat Yoga Saptaha (MMB) organised for a week, from June 21-27, 2015 , was an ambitious movement to prevent India becoming "Diabetes capital of the World".

Conclusions of the annual follow up results of Nationwide Yoga based lifestyle MMB camps organized by VYASA are shown in the Table 2 and Figure 1 below. Table 3 provides the details of the yoga based lifestyle intervention that was followed during the MMB camps.[32–34]

Table 1 Summary of Major Studies on Yoga Based Lifestyle Interventions for Type 2 Diabetes Mellitus

Variable studied	Study design		
	Uncontrolled clinical trials	Non-randomized controlled clinical trials	Randomized clinical trials
Fasting glucose Reduced	30, 32,38, 40	41, 34	25, 20
Post-prandial glucose Reduced	30, 32,40	41,34	20
Reduced fructosamine		40	
Reduced OGT maximum/AIT	40		
Fasting glycated hemoglobin Reduced	30, 40		25, 35,18
Total cholesterol Reduced	32, 30, 38	41,29,34	35, 20
Triglycerides Reduced	32,30,38		20
Low density lipoprotein (LDL)Reduced	32,30,38	34	35, 20
High density lipoprotein (HDL) Increased	32,30,38		35, 20
Reduced very LDL	32,30,38		20
Reduced Oxidative Stress		39	

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Table 2 Annual follow up of yoga based lifestyle mmb camps – conclusions

1	A total of 56,352 participants were taught the yoga based lifestyle module for diabetes (Table 1) by the cooperation of several organizations by using video CDs and booklets of the yoga practice. Laboratory tests were sponsored by Ministry of Health and Family Welfare, Govt. of India
2	MMB saptaha created wide awareness amongst the public in most parts of India through hard work of large number of volunteers, doctors and yoga teachers organized by arogyabharati, vidya bharati, sevabarati, vigyanabharati and krida bharati supported by several philanthropic organizations.
3	MMB saptaha movement was successful in introducing yoga based life style change program round the country for just over 56,000 people (diabetics, pre-diabetics and non diabetics) from urban and rural India
4	63 % who attended the saptaha were females and the age ranged from 12 to 90 years
5	Of the 56000 who attended the camps , 25% were known diabetics of which 70 % were males, 39% were in high risk as per IDRS
6	At base line, Mean HbA1C of the population was 7.14 ± 1.98; Total cholesterol was > 201 mg% in 28.5% subjects. Triglycerides was > 150 mg % in 44%subjects; 51% had LDL>100mg%; 41% had HDL<40 mg%.
7	73% of diabetics were taking treatment. Of these 61% were taking oral hypoglycemic drugs 8% were taking insulin
8	Diabetic subjects taking other than allopathic medications Ayurveda(11%), homeopathy (3%), local herbal medicines (9%) etc.
9	About 50% of the subjects were doing blood check up regularly
10	Complications in diabetics 36% of the diabetics had eye problems - of these 27% were cataract 27% of diabetics had Leg pain 0.8% of diabetics had non healing ulcers in their legs; 7% of diabetics had Cardiac problems ; of these 13% had bypass surgery. 2.58% of diabetics had Renal complications 1% had history of stroke at the time of presentation.
Follow up results	
11	Mean HbA1c - reduced by 6.6 % by 4th month 7.4% (7.14 to 6.61) at one year follow up
12	Mean FBS- reduced by 18% i.e. 25 mgs (136 to 111mg%) at one year follow up
13	triglycerides reduced by 10.7 % (mean from 166.9 to 149.11mg%) at one year
14	There were no adverse effects reported although the practices were taught through CDs in remote villages where there were not enough well trained instructors
15	This awareness has led to demand by many philanthropic institutions for organizing camps and continuing the programs in different parts of the country which is ongoing

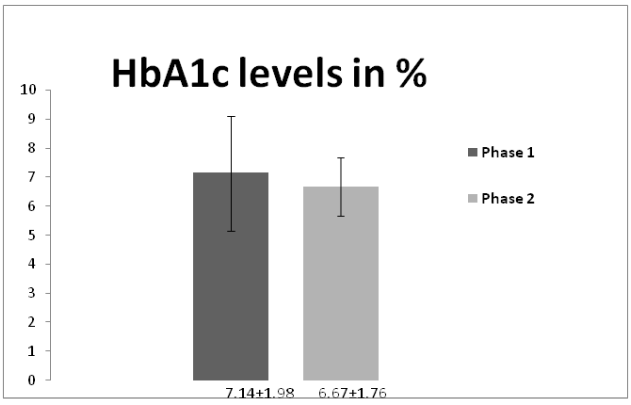

Figure 1 Changes in HbA1C levels before and after 16 weeks of Yoga based lifestyle camps.

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Table 3 Yoga based lifestyle Module for Prevention and Management of Type 2 Diabetes

Number	Name	Posture	Practices
1	Breathing practices (5 minutes)	Standing	Hands Stretch Breathing
		Sitting	Shashankasana Tiger Stretch Breathing
			Padahastasana-Ardhachakrasana vyayama
		Standing	Trikonasana vyayama
2	Loosening practices Shitihilikarana vyayamah (5 minutes)		Kati parivartana vyayama (Spinal Twist)
		Sitting	Chakkichalana
			Bhunamanasana
		Supine	Pawanmuktasana Kriya
		Prone	Dhanurasana Swing
3	Relaxation(5 minutes)		Instant Relaxation Technique
4	Surya NamSurya Namaskara (5 minutes)		12 steps
5	Asanas(10 minutes each)	Standing	Ardhakatichakrasana
			Parivritta Trikonasana
		Sitting	Vakrasana
			Ardhamatsyendrasana
		Prone	Bhujangasana Dhanurasana
		Supine	Pawanmuktasana Matsyasana
	Relaxation(10 minutes)		Deep Relaxation Technique
6	Kriyas		Kapalabhati, Vaman Dhouti (Once a week)
			Nadishuddhi
7	Pranayama (10 minutes)		Bhramari pranayama
			Om chanting
8	Meditation (20 minutes)		Cyclic Meditation

Discussion

The beneficial effects of yoga seem to be due to the relaxation response that has the potential to reduce the heightened stress responses through techniques that promote mastery over the modifications of mind.[35,36]

In a recent randomized controlled trial (funded by the ministry of health and family welfare, new Delhi),[20] we recruited 277 DM2 subjects (both male and female,28-70 years) and randomized them into two groups; one group practiced yoga based lifestyle intervention that included lecture sessions on yogic lifestyle, asanas, pranayama and meditation, while the control group followed comparable exercise based life style program that included life style education and physical exercises (one hour daily for 9 months with supervised practices for both groups). Yoga based life style modification program was better than exercise in significantly reducing the psychological stress, anxiety and depression along with reduction in oral hypoglycemic medication requirement and LDL levels and improving HDL levels. Yoga was found to be similar to exercise based life style modification in reducing blood glucose, HbA1c, Triglycerides, total cholesterol and VLDL levels.[20] Yoga based lifestyle offers a comprehensive solution to the problem of diabetes: as a preventive program,[37,38] for pre-diabetes, for risk reduction,[38] and management of complications.[39–42]

Two recent meta- analyses have concluded that yoga is beneficial for T2DM and can help reduced both FBS and HbA1C.[43,44] They concluded that beneficial effects of yoga as an add-on intervention to standard treatment in comparison to standard treatment were observed for FBS [Standardized Mean Difference (SMD) -1.40, 95%CI -1.90 to -0.90, $p<0.00001$]; PPBS [SMD -0.91, 95%CI -1.34 to -0.48, $p<0.0001$] as well as HBA1C [SMD -0.64, 95%CI -0.97 to -0.30, $p<0.0002$]. With this available evidence, yoga can be considered as add-on intervention for management of diabetes.[43,44]

Stress, depression and T2DM

Energy mobilization is a primary result of the fight or flight response. Stress has long been shown to have major effects on metabolic activity and it is a potential contributor to chronic hyperglycemia in diabetes. Stress stimulates the release of various hormones, which can result in elevated blood glucose levels. Although this is of adaptive importance in a healthy organism, in diabetes, as a result of the

relative or absolute lack of insulin, stress-induced increases in glucose cannot be metabolized properly.[45] Though there are drugs to control sugar levels, unfortunately, there is no such ready pharmacological formulation to combat stress. In fact, increasing the number of drugs and injections only adds to the burden of stress on the individual which in turn may contribute to reduced compliance with the drug regimen.[46] A study examined stress, coping and regimen adherence as determinants of chronic and transient metabolic control in diabetes on 57 type 1 diabetic patients and 61 type 2 diabetic patients. They found that emotional persons had worse glycemic control than those who were better self – regulated. This difference was mainly attributed to the factor of stress which was higher in emotional people.[46] Although human studies on the role of stress in the onset and course of type II diabetes are few, a large body of animal study supports the notion that stress reliably produces hyperglycemia in this form of the disease. Furthermore, there is mounting evidence of autonomic contributions (which are known to be deranged by psychological stress) to the patho-physiology of this condition in both animals and humans.[45]

Type 2 diabetes (T2DM) almost doubles the risk of co-morbid depression, with lifetime prevalence up to 29%.[47] Recognition and treatment of depression in T2DM are important because of its association with hyperglycaemia, diabetic complications and poor quality of life (QoL). Although currently available medical therapy for depression is effective in reducing depressive symptoms in diabetes, it has considerable side effects.[47] Another study reported that higher percentage of diabetics with psychiatric symptoms had one or more current complications compared to 'normal' diabetics.[48] Yoga based lifestyle and its philosophy is equipped with variety of coping techniques which work at all the levels human existence including body, breath, psyche and spirit through asanas, pranayama, meditations, relaxation techniques and vedic knowledge base respectively.[36] Therefore, yoga is the most popular non-pharmacological regimen to manage stress and its consequences.[49,50] incorporates Yoga techniques have also been found to be useful in managing psychiatric disorders, a study found yoga breathing technique to be as efficacious as the drug Impiramine for treatment of depression.[51]

Conclusion

T2DM is a multi-factorial lifestyle disorder which requires holistic multi-dimensional lifestyle based approaches for its management. Yoga based lifestyle intervention as an adjuvant to conventional practices has the potential to prevent India become diabetic capital of the world.

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Conflict of interest

The author declares that there is no conflict interest.

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