

Research Article

Short term effect of Sudarshan Kriya Yoga on gingival crevicular fluid (GCF) glucose level in diabetic and non-diabetic patients

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Abstract: The aim of the present study was to assess the effect of Sudarshan Kriya Yoga (SKY) on type 2 diabetes patients by assessing the glucose level in GCF by using commercially available glucometer. A total of 30 participants in the age group of 21-70 years were recruited for the study. Participants were divided into two groups: Group I: Fifteen otherwise healthy individuals. Group II: 15 individuals with type 2 diabetes. All the participants underwent the part 2 SKY training (advanced) by Art of Living foundation for 7 days duration. On the first day of SKY, the GCF glucose levels were recorded by using commercially available glucometer (OneTouch Horizon[®]) from diabetics and nondiabetics. The same procedure was followed on the final day of SKY. The GCF glucose level in otherwise healthy patients was found to be 86.27±63 mg/dL before SKY and 41.40±15.05 mg/dL after SKY (p = 0.022). The GCF glucose level in type 2 diabetic patients was 142±33.87 mg/dL before SKY and after Sudarshankriya was 68.73±35.42 mg/dL (P <0.001). The action of SKY on glucose level in GCF was counter active in nature and felt to be distinctly different than the effect of drugs.

Keywords: Sudarshankriya yoga, Art of Living, stress, diabetes mellitus, periodontitis, GCF.

INTRODUCTION

According to International Diabetes Federation (IDF) atlas, there are 382 million people living with diabetes worldwide. Reports flash that by 2035, 592 million people or 1 in 10 people will have diabetes. A further 316 million people are currently at high risk of developing type 2 diabetes, with the number expected to increase to almost 500 million within a generation. As per World Health Organization estimation, it could rise to 333 million in 2025[1].

SKY is the special yogic package based on rhythmic breathing exercises called Sudarshan Kriya, pranayama involving ujjayi breathing (breathing touching the throat), emphasizes the importance of prayers, asanas, pranayama, meditation, satvic diet (vegetarian pure diet) and highlights the interactive discussions for positive attitude, training, based on Art of Living knowledge points [2,3]. The rhythmic breathing and relaxation technique is helpful in improving cellular oxygen uptake and in turn glucose metabolism in diabetes. The SKY, part-2 is a 7-day course for participants who have completed part-1 course which includes meditations, yoga, and other processes. Often a residential course, consisting of Sudarshan Kriya guided meditations, silence, yoga (postures and breathing exercises, Satsang (group

singing of devotional songs) by a trained teacher is offered.

Types of asanas, pranayamas, and kriyas (cleansing process) differ in different yoga schools. However, there is a consensus among yoga experts that SKY is a necessary lifetime choice for coping with various types of stresses. This type of yoga is said to heal and purify from within and is a natural noninvasive stress relieving technique [4].

Diabetes mellitus is associated with a wide range of complications such as retinopathy, nephropathy, neuropathy, micro and macrovascular diseases, altered wound healing and periodontitis. It is established that diabetes mellitus and periodontitis seem to interact in a bidirectional manner. A large number of patients seeking dental treatment are unaware of their undiagnosed diabetic mellitus, thus the dentist may increase his/her importance as a member of health team participating in the search for undiagnosed, asymptomatic diabetes mellitus.

Negative life events manifested as psychological stress and depression are common in day-to-day life, emphasizing the relationship between the person and the environment. Stress is part of the human

condition which is universally present but to varying degrees and with different effects on individuals. Anxiety, depression, or other psychosocial stresses produces well characterized neuro-endocrine and biochemical changes. Several studies have demonstrated the association between stress, anxiety, depression, and diabetes.

GCF is a serum ultrafiltrate of blood originating from the vasculature subjacent to the sulcus. GCF flow rates and the increased concentration of molecules that mediate innate and adaptive immune responses correlate with the severity of periodontal inflammation. As such, numerous GCF constituents have been characterized to identify biomarkers that may be used to monitor the initiation and progression of gingival inflammation and the immune response [5].

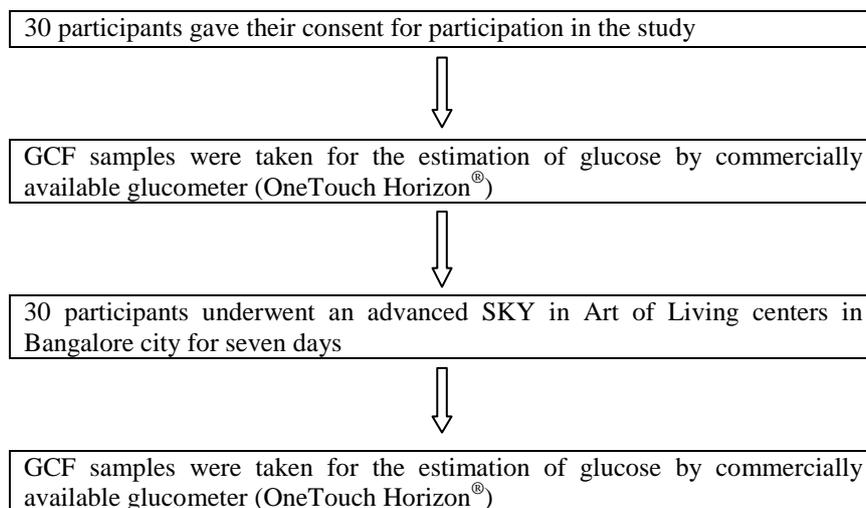
Many case studies by medical practitioners from different countries observe the effect of SKY on chronic metabolic disorders. Its value for treating different medical and mental ailments has been established by National Institute of Mental Health[6]. Though studies[7] are initiated to evaluate the potential of SKY in treating other ailments, systematic scientific experiments are necessary to evaluate and establish the

efficacy of this yogic practice as a complementary therapy for type 2 diabetes. With the fact in mind that the number of diabetic patients expected to increase to almost 500 million within a generation, we conducted a preliminary observation study on the effects of this yogic practice on the level of glucose in GCF as measured by commercially available glucometer (OneTouch Horizon[®]) in diabetic and non-diabetic population.

MATERIALS AND METHOD

A total of 30 participants in the age group of 21-70 years were recruited for the study. An informed written consent was obtained from the participants. Participants were divided into two groups: Group I: Fifteen otherwise healthy individuals. Group II: 15 individuals with type 2 diabetes. All the participants underwent the part 2 SKY training (advanced) by Art of Living foundation for 7 days duration. All the type 2 diabetic patients were on prescribed medications. GCF glucose level was recorded by using commercially available glucometer (OneTouch Horizon[®]) before undergoing the course. Same procedure was repeated after 7 days' practice of SKY on 30 participants which gave the second observation. Collected data was analyzed by paired t test.

Schematic representation of the study design



RESULTS

Fifteen otherwise healthy individuals in the age group of 21-70 years were included in the group I of the study. Among 15 type 2 diabetic patients, one participant was in the age group of 31-40 years, four in the age group of 41-50 years, five in the age group of 51-60 years, and five in the age group of 61-70 years as shown in Fig- 1. The GCF glucose level in group I participants was found to be 86.27 \pm 63 mg/ml before SKY and 41.40 \pm 15.05 mg/ml after SKY ($p=0.022$).

The GCF glucose level in group II participants was 142 \pm 33.87 mg/ml before SKY and after Sudarshankriya was 68.73 \pm 35 ($p < 0.001$) (Table 1). The GCF glucose levels in the age group of 21-30 years before Sudarshankriya was 86.27 \pm 63, 31-50 years was 123.60 \pm 31.16, greater than 50 years was 151.20 \pm 32.72 ($p=0.014$). The GCF glucose levels in the age group of 21-30 years after Sudarshankriya was 41.40 \pm 15.05, 31-50 years was 55.20 \pm 27.22, greater than 50 years was 75.50 \pm 38.34 with a ($p=0.016$) (Table2).

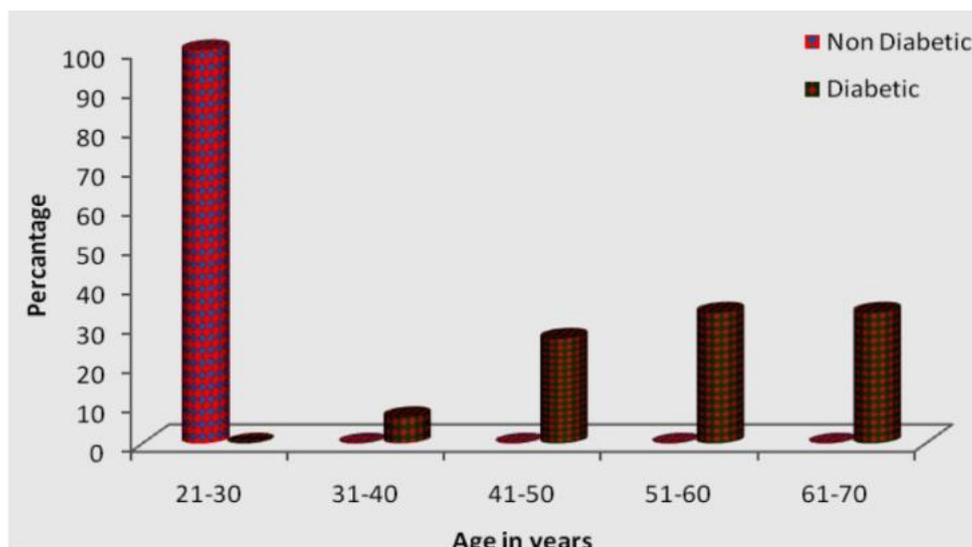


Fig-1: Age distribution of patients

Table 1: GCF glucose levels in nondiabetics and diabetics before and after SudarshanKriya

GCF levels	Glucose	Before sudarshankriya	After sudarshankriya	Difference	t value	P value
Non Diabetic		86.27±63.00	41.40±15.05	44.867	2.574	0.022*
Diabetic		142.00±33.87	68.73±35.42	73.267	4.698	<0.001**
P value		0.005**	0.010*	-	-	-

Table 2: GCF glucose levels in age distribution of participants before and after SudarshanKriya

GCF Glucose levels	Age in years			Total	P value
	21-30	31-50	>50		
Pre course	86.27±63.00	123.60±31.16	151.20±32.72	114.13±57.21	0.014*
Post course	41.40±15.05	55.20±27.22	75.50±38.34	55.07±30.14	0.016*
P value	0.022*	0.051+	0.005**	<0.001**	-

DISCUSSION

SKY is well known as the ancient lifestyle approach for healthy mind and healthy body. A review of research published between 1970 and 2004 on the effect of yoga on insulin resistance has been done based on 70 studies[8]. These studies provide data that SKY (yoga) can improve many physiological indicators of insulin resistance including glucose tolerance and insulin sensitivity. Many studies revealed that oxidative stress levels were found to be influenced by SKY practice[7,9]. SKY includes meditation, pranayama, yogasanas, Art of Living knowledge points including living in the present moment and above all cycles of breaths. By practicing SKY, body gets enough oxygen which can alleviate cellular metabolism. SKY also propagates adherence to satvic diet which is essentially fresh food, fruits and vegetables, and avoids sweets, fries and spicy foods.

The studies conducted by researchers observed that type 2 diabetes is highest among Indians with one in five diabetics to be Indian since the year 2005. It is found that the prevalence is increasing particularly among young adults in parallel with continuing rise in obesity[6]. Type 2 diabetes is considered to be

psychosomatic disease associated with oxidative stress. SKY is a rhythmic breathing and relaxation technique which in turn is helpful in improving cellular oxygen uptake and in turn glucose metabolism in diabetes.

In diabetic patients, immediate decrease of blood sugar level has been observed after the session of SudarshanKriya in a recent study, wherein SKY practiced by 87, type 2 diabetic patients resulted in reduction in oxidative stress and fasting glucose level[7].

Significant reduction in biochemical markers for cardiovascular disease and diabetes mellitus on 98 subjects has been reported study conducted to assess short-term (9-day) impact of a breathe life style intervention based on yoga[11]. In a study conducted on 149 non-insulin dependent diabetes mellitus patients after 40 days of yoga therapy authors have reported changes in blood glucose and glucose tolerance by oral glucose tolerance test[10]. These studies support our findings about SKY with a difference and SKY demonstrated immediate changes in comparison to other classical yogic techniques.

In a study conducted at Hyderabad, India, 73 healthy volunteers showed reduced levels of serum triglycerides and VLDL-cholesterol at the end of the first 30 days (pranayama practice only) and increased levels of HDL cholesterol and free fatty acids at the end of 30 days. Women showed reduced levels of serum free fatty acids at the end of both the first 30 days and the three-month session and also showed reduced levels of total cholesterol, triglycerides, LDL cholesterol and VLDL cholesterol by the end of the three-month session[12].

Researchers at the Universite de la Mediterranee in France studied the effects of ujjayi breathe training on everyday breathing patterns. After the training, participants showed a significant increase in exhalation duration and a modest increase in tidal volume[13]. SKY also emphasizes the use of ujjayi breathing during pranayama which helps in better exchange of oxygen and carbon dioxide.

CONCLUSION

The results of present study indicate that GCF collected during diagnostic periodontal examination may be an excellent source for glucometric analysis. The sampling procedure performed in this study is much easier and less time consuming. This preliminary study on short term effect of advanced SKY has indicated beneficial action on GCF glucose level in type 2 diabetes patients and otherwise healthy individuals.

The reliability of GCF glucose level using glucometer directly into the sulcus has to be standardized. The precision must be considered to evaluate better values of individual measurements. However, further studies with large sample sizes and long duration follow up are required to evaluate the outcome of the results.

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