

Impact of Scientific Pranayama on Type 2 Diabetes

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ABSTRACT

With the rising global diabetes patients in India, there is an increased need for cost effective and accessible complementary therapies. This research refers to the integration of body, breath and mind which refers to scientific validation from randomized controlled trials (RCT'S) to study the facts and effect of structured pranayama on glycemic indices which include fasting blood sugar (FBS), Post prandial blood sugar (PPB'S) and HbA1C in T2DM patients. A total of 150 diabetic patients aged between (35-75) years in which their HbA1C is greater than 6.5% are considered. One group is assigned a specific breathing techniques (experimental group) and a group which does not assigned (control group) practiced for 45 days to 6 months. Every day they practiced the scientific pranayama namely kapalabhati, Bahya Kumbhaka, Anuloma villoma, Bhramari, udgeetha & Pranava. Experimental group patients have a reduction of FBS, PPBS&HbA1C, when compared to control group patients. This shows that scientific pranayama is effective for T2DM management in patients.

Keywords: Scientific Pranayama; Type 2 Diabetes Mellitus; Glycaemic indices; Fasting Blood Sugar (FBS); Postprandial Blood Sugar (PPBS); HbA1c; Randomized Controlled Trials (RCTs).

1.INTRODUCTION

T2DM is a chronic metabolic disorder characterized insulin resistance, hyperglycemia, neuropathy etc. Pranayama is the ancient Indian science of breath regulation acts as a non-pharmacological for managing T2DM. The Scientific pranayama techniques are structured practice which helps to regulate blood sugar, improves insulin sensitivity, reduces stress related hormones and reduces diabetes related complications. The pranayama techniques involved are kapalabhati (fire breathing), Anuloma villoma (Alternate nostril breathing), Bharamari (humming bee breathing), Bahya Kumbhaka (External retention of breath), udgeetha & pranava (meditation). In the modern era, pranayama is a non-pharmacological, cost effective compared to the conventional diabetes management. This paper presents clinical evidence from randomized controlled trials (RCT'S) and the impact of scientific pranayama on glycemic parameters, autonomic functions and the quality of life in T2DM patients. This gives the impact of pranayama role on physical and mental health in the modern era.

1.1 Scientific basis and mechanism

Scientific pranayama has got therapeutic effect. Pranayama activates the β -cell function thereby reducing the fasting blood glucose thereby reducing the hypothalamic pituitary adrenal (HPA) axis response and increase in oxygen concentration.

Figure 1 explains mechanism of the scientific pranayama which reduces risk for T2DM & its complications. The main mechanisms are 1. Vagal tone is increased through diaphragm breathing 2. There is improvement of β -cell function through pancreatic stimulation. 3. There is reduced cortisol hormone 4. The basic metabolic rate & oxygen level has increased. Research confirms that sympathetic activity is reduced, thereby reducing FBS, PPBS&HbA1c.

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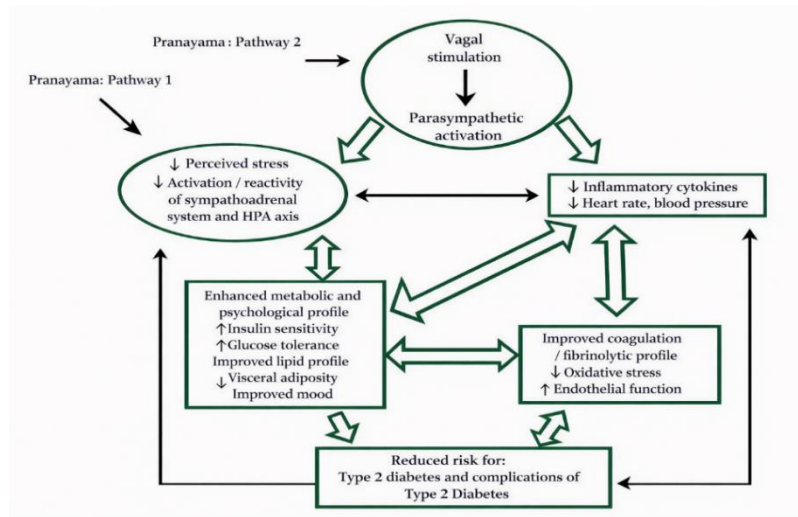


Figure 1. Mechanisms by which scientific pranayama reduces risk for Type 2 Diabetes Mellitus

1.2 Methodology

A randomized control group was adopted for the study. About 150 T2DM patients, where the age range in between 35 years to 75 years having the HbA1c is greater than 6.5% were recruited. Participants of experimental group, where specific pranayama techniques were assigned and a control group where it is not assigned any pranayama techniques are considered.

1.3 Intervention Protocol

The intervention duration ranges from 45 days to 6 months with daily 60 minutes under supervision sessions including kapalabhati, Bahya Kumbhaka, Anuloma villoma, udgeetha & Pranava. The intervention was delivered to the participants of experimental group.

1.4 Outcome Measures

The outcomes include were pre & post intervention assessments of Fasting blood sugar (FBS, mg/dl), post prandial blood sugar (PPBS, mg/dl) & glycated haemoglobin (HbA1c, %).

2. RESULTS AND OBSERVATIONS

The participants in the pranayama experimental group have reduction in FBS, PPBS & HbA1c when compared with the control group. The quality of life that is psychological, environmental and physiological have improved in the experimental group.

Table 1. Age group-wise glycaemic parameters (FBS, PPBS, HbA1c) before & after pranayama.

Age	FBS Before	FBS After	PPBS Before	PPBS After	HbA1c Before	HbA1c After	% Reduction
30-35	195	120	210	195	9.0	6.5	2.5
35-40	166	130	225	175	8.5	6.5	3.0
40-45	190	100	240	200	9.5	8.5	0.8
45-50	175	145	230	195	9.0	9.5	0.8
50-55	175	170	225	210	9.8	9.0	0.8
55-60	180	170	255	210	9.8	9.5	0.3
60-65	100	170	230	230	9.8	9.0	0.3
65-70	195	130	235	235	9.8	9.5	0.8
70-75	195	130	235	235	9.0	6.0	2.1

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Note: FBS = Fasting Blood Sugar (mg/dL); PPBS = Postprandial Blood Sugar (mg/dL); HbA1c = Glycated Haemoglobin (%); % Reduction = absolute reduction in HbA1c over intervention period.

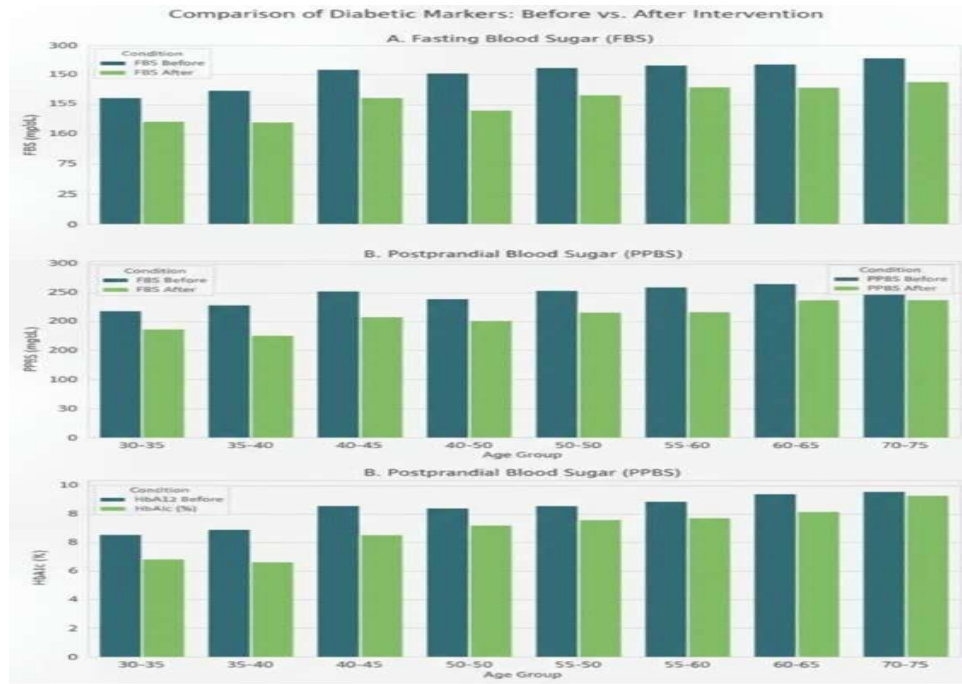


Figure 2. HbA1c levels for age groups 30–75 years, before and after pranayama intervention.

2.1 Discussion

The research shows that scientific pranayama serves as a complementary approach in the management of T2DM. The study shows that regular practice of pranayama techniques contributes to the improvement of glycaemic parameters, increased metabolic regulation, autonomic balance, reduction of sympathetic activity and increased parasympathetic which plays an important role in glucose management. The physiological impact by the pranayama practice there is improved pancreatic activity, enhanced insulin sensitivity, stress reduction, better tissue oxygenation, improved endocrine balance & glucose utilization.

3. CONCLUSION

The research evaluated the impact of (4-6) months of scientific pranayama on glycaemic control among 150 T2DM patients aged (35-75) years. Blood glucose levels are obtained using FBS, PPBS & HbA1c before & after the intervention. The research revealed a reduction in FBS, PPBS & HbA1c among participants. The statistical analysis indicates that consistent practice of scientific pranayama has positively influenced blood sugar regulation in T2DM patients.

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