

Impact of Asana and Pranayama on HbA1c in Diabetic Men

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Abstract: Introduction: Diabetes, also referred to as diabetes mellitus, is a chronic metabolic disease marked by elevated blood glucose (sugar) levels brought on by insufficient insulin synthesis, poor insulin action, or both. It has become a major global health issue that affects millions of people globally and presents enormous obstacles for both healthcare systems and society at large. The WHO reports that the prevalence of diabetes has been rising over time, especially in low - and middle - income nations. Worldwide, type 2 diabetes makes up the great majority of diabetes cases. About 90% of diabetics have type 2 diabetes, according to the WHO. Diabetes has become more common over time due to several causes including poor diets, obesity, genetic predispositions, sedentary lives, and insufficient physical activity. If diabetes is not controlled, it can result in several complications that impact different body systems and organs, such as the kidneys, heart, eyes, nerves, and blood vessels. These issues raise healthcare expenses, drastically lower life quality, and raise the risk of early death. Objectives: Comparing the biochemical variable of HbA1c in diabetic men who practice yoga with those who do not is the main goal of this study. Certain poses squeeze and compress the abdomen, encouraging the proper functioning of the pancreas, improving insulin sensitivity, and allowing cells to better respond to insulin and effectively regulate blood sugar levels. Materials and Methods: The study included thirty type - 2 diabetic men from Nerkundrum, a suburb of Chennai. The number of participants was divided into two equal groups. The experimental group practiced asana: Janu Shirasasana, Paschimotanasana, Ushtrasana, Vakrasana, Padahasthasana, Trikonasana, Bhujangasana, Dhanurasana, Ardha Shalabhasana, Pawanmuktasana, Sethubandasana, Savasana, and Pranayama: Adham pranayama (Abdominal breathing), Bhramari, Nadi Shodhana for 16 weeks. Conclusion: The findings support the theory that practicing asanas and pranayama has significantly altered the HbA1c (Glycated Hemoglobin) level of diabetic men.

Keywords: Diabetes Mellitus, HbA1c (Glycated Hemoglobin), Biochemical, Asana, Pranayama

1. Introduction

Perfection in asana is achieved when the effort to perform it becomes effortless and the infinite being within is reached.

– Patanjali

Type - 2 Diabetes Mellitus (T2DM) is chiefly produced by a blend of two key reasons the malfunctioning of insulin secretion by the Beta cells of the pancreas and the incapability of insulin receptors in the cells, it is one of the most common metabolic ailments. Insulin secretion and action have to exactly encounter the metabolic claim; therefore, the molecular actions implicated in the amalgamation and secretion of insulin, and also, the insulin retaliation in receptors must be strongly controlled. Diabetes is a chronic disease that is caused once the pancreas is unable to produce insulin, or else when the insulin produced by the pancreas is not properly utilized by the body. Pancreas secretes the hormone insulin, which functions as a key to allow glucose to be absorbed by the cells to be used as fuel to produce energy, from the circulation of blood. The starch food we eat is broken down as sugar in the plasma. This sugar circulating in the blood will be allowed to be absorbed by insulin. Unable to secrete or use insulin effectually open on to high glucose amount in the plasma, identified as Hyperglycemia.

Yoga is an Art and Discipline of healthy living. It encourages complete development and synchronization in physical,

intellectual, and psychic disciplines. In the past few years, studies have gathered extensive proof of the mechanism and effectiveness of yoga. The all - inclusive access to Yoga is well reputable and it transports harmony in the entire life and consequently, prevents diseases, elevates good health, and takes care of numerous sedentary lifestyle ailments. The goal of Yoga is Self - Realization, to reach a state of complete freedom from overcoming all types of grief. When our body, mind, and spirit are in harmony, we will bring health and harmony to the entire world. We shall accomplish this by keeping our distance from the outer world and by being an essential component of the human race. Yoga therapy aims to use yoga to assist individuals in moving toward greater health and freedom from illness. In the self - empowering approach to yoga therapy, the patient and the yoga therapist collaborate to create a personalized, dynamic yoga routine. This technique addresses the condition from several perspectives and aims to progressively reduce suffering in a complementary and non - invasive manner. According to Gheranda Samhita (Chapter 2, Verses 16–17), regularly engaging in asana practice helps the body become lighter and slenderer. It suggests that doing asanas might help cleanse the blood and extend the life of the practitioner. Hatha Ratnavalli claims that a yogi who practices yoga mindfully and intently can fend off illness and slow down the aging process. These works present different perspectives on physical postures and their effects on the health of the practitioner. The Chhandogya Upanishad describes Prana as an interior matrix (subtle energy) and Vayu as an external matrix (gross energy). It is

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believed that the gross body (Annamaya kosha) is nurtured by the subtle body (Pranamaya kosha), which is composed of Chakras and Nadis. These Nadis are the bearers of the prana, which nourishes many systems and organs, opens the chakras, and affects every physiological function occurring in the human body. The pranayama techniques of Bhramari and Nadi Shodhana are thought to calm the autonomic nervous system, ease stress, and encourage relaxation. These effects may have a beneficial effect on a person's HbA1c level.

2. Aims and Objectives

The main goal of this study is to determine the impact of consistent practice of Asana: Janu Shirasasana, Paschimotanasana, Ushtrasana, Vakrasana, Padahasthasana, Trikonasana, Bhujangasana, Dhanurasana, Ardha Shalabasana, Pawanmukthasana, Sethubandasana, Savasana, and Pranayama: Adham pranayama (Abdominal breathing), Bhramari, Nadi Shodhana on HbA1c level in men with diabetes. The research aims to determine whether longer - term, consistent practice of asana and pranayama leads to more significant and long - lasting reductions in HbA1c. A cohort of diabetic men who meet the study's inclusion criteria was sought to ensure a representative sample. Before beginning asana and pranayama practice, pre - tests of each participant's HbA1c were done to establish a baseline for assessing changes. This study aims to investigate in detail the effects of certain asana and pranayama on the HbA1c level in men with diabetes to gain a better understanding of the potential benefits of these practices in the management of diabetes.

3. Materials and Procedures

Below is a detailed explanation of the training techniques, statistical methodologies, variables, and participants. Various diabetes clinics employed marketing campaigns and public announcements to attract new subjects. Before any data collection, study participants who fulfilled the inclusion criteria gave their informed consent. In total, thirty people

participated in the trial and were divided into two groups: the experimental group, which included type 2 diabetes and was with oral allopathic medicine, also received yoga intervention; the control group, which also included diabetes, was with only allopathic medication. HbA1c, or glycated hemoglobin, was assessed using conventional methods for drawing blood samples. Before and after yoga training, Pre - test and Post - test were done for both groups. The Experimental group received instruction and practice in Asana: Janu Shirasasana, Paschimotanasana, Ushtrasana, Vakrasana, Padahasthasana, Trikonasana, Bhujangasana, Dhanurasana, Ardha Shalabasana, Pawanmukthasana, Sethubandasana, Savasana, and Pranayama: Adham pranayama (Abdominal breathing), Bhramari, Nadi Shodhana for five days per week for a period of 16 weeks, and 60 minutes each session.

Statistical Procedure

The data collected from the experimental and control groups before and after the experiment, focusing on HbA1c, was evaluated to see if there were any statistically significant differences. This investigation made use of the F - ratio analysis of variance.

4. Results

For all the subjects before the practice of Asana and pranayama, the pre - test mean values of the experimental group and control group for HbA1c are 6.95 and 6.93 mg/dl. The post - test mean values of the experimental group and the control group for HbA1c are 6.21 and 7.01 mg/dl respectively. The outlined research hypothesis is accepted. It is inferred that there is a significant difference between the adjusted post - test means of the HbA1c in Diabetic Men.

Analysis of data:

The results of the analysis of co - variance on HbA1c test results from the pre and post - test are collated and are shown in the table.

Table 1: Analysis of Co - Variance of the Pre- Test and Test Means of the Experimental Group and Control Group on HbA1c in Diabetic Men

Group	Experimental	Control	Source of variance	Sum of squares	df	Mean square	'F' Ratio
Pre - Test Mean	6.95	6.93	Between	0.001	1	0.001	0.016 NS
SD	0.24	0.26	Within	1.838	28	0.066	
Post - test Mean	6.21	7.01	Between	4.913	1	4.913	61.2* S
SD	0.29	0.26	Within	2.247	28	0.080	
Adjusted Post - test mean	6.94	6.61	Between	3.084	1	3.084	46.1* S
			Within	2.106	28	0.066	

S – Significant

NS – Not Significant

Table - 1 result shows that the pre - test mean score of the experimental group is 6.95 and the control group is 6.93. Therefore, it is observed that the obtained 'F' value is 0.016 for the Pre - Test mean score. Therefore, the framed research hypothesis is rejected. It is inferred that there is no significant difference between the pre - test means of the HbA1c in Diabetic Men. Also, the Post - test mean score of the experimental group is 6.21, and the control group is 7.01. Therefore, it is evident that the obtained 'F' value is 61.2 for

the Post - Test mean score. Therefore, the framed research hypothesis is accepted. Further, the above table takes into consideration the adjusted post - test mean score of the experimental group is 6.94 and the control group is 6.61. Therefore, it is evident that the obtained 'F' value is 46.1. Therefore, the framed research hypothesis is accepted. It is inferred that there is a significant difference between the adjusted post - test means of the HbA1c in Diabetic Men.

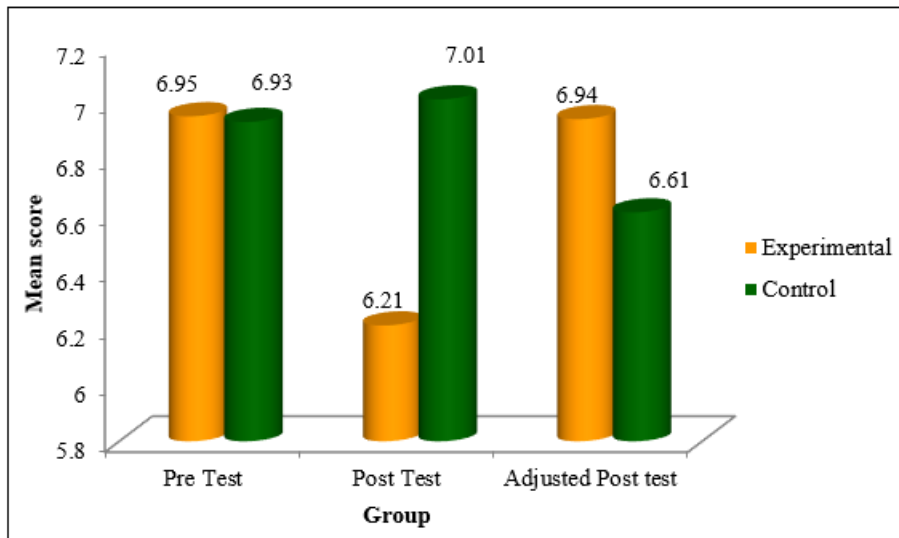


Figure 1: Graph shows the pre test and post test means of the experimental group and Control group and control group on HbA1c in Diabetic mean

5. Discussion on Findings

The researcher discussed that there are considerable results from the literature and the findings of the present study show that there is no significant difference between the pre - test means of the HbA1c in Diabetic Men. Even though the framed research hypothesis is rejected. However, these findings are the statistical result proved that there is a significant difference between the adjusted post - test means of the HbA1c in Diabetic Men. Therefore, the framed research hypothesis is accepted. Even though HbA1c has been endorsed for the diagnosis of diabetic men, in most of the countries worldwide, some testing strategies and cutoff ranges are still being debated. The prognostic potential of HbA1c lies in its unique ability to assess retrospective glycolic control as well as predict the lipid profile in diabetic men patients. As the epidemic of diabetes continues to grow worldwide, HbA1c tests may continue to be implemented as part of the diagnostic. Since the HbA1c test is now recommended for diagnosing diabetes and minimal variation of the concentration affects the Asana and Pranayama, the results must be reliable and interference - free. One must become more stringent that any unacceptable results are detected, not reported and each method is evaluated for Hb variant interference. There is a proportion of HbA1c in blood. Studies have also reported significant bias among analytical methods to measure HbA1c levels.

6. Conclusion

The current study offers the necessary scientific foundation and validates a few of the beneficial effects of training in Asana: Janu Shirasasana, Paschimotanasana, Ushtrasana, Vakrasana, Padahastasana, Trikonasana, Bhujangasana, Dhanurasana, Ardha Shalabasana, Pawanmuktasana, Sethubandasana, Savasana, and Pranayama: Adham pranayama (Abdominal breathing), Bhramari, Nadi Shodhana Bhramari and Nadi Shodhana pranayama. Those who practiced Asana and Pranayama for four months showed a significant drop in HbA1c (Glycated Hemoglobin). Certain cardiovascular risk factors, including obesity, hypertension, and dyslipidemia, as well as stress - related mental problems

and respiratory disorders, can benefit from Asana and Pranayama.

References

- [1] Kulkarni, Rajesh, Effect of one Year of Yoga Therapy on Glycemic Control among Patients with Type 2 Diabetes Mellitus - A Randomized Controlled Trial, *Indian Journal of Physical Therapy and Research* 4 (1): p 51 - 57, Jan-June 2022. | DOI: 10.4103/ijptr.ijptr_17_22.
- [2] Puneet Misra, Effect of Community - Based Structured Yoga Program on Hba1c Level among Type 2 Diabetes Mellitus Patients: An Interventional Study, *Int J Yoga*.2021 Sep - Dec; 14 (3): 222-228. doi: 10.4103/ijoy. ijoy_150_21.
- [3] Rajesh Rajput, Effect of Yoga on Glucose Control and Quality of Life in Patients of Prediabetes, *Metabolic Syndrome and Related Disorders* 2021 Oct; 19 (8): 417 - 421. doi: 10.1089/met.2020.0040.
- [4] Maheshkumar Kuppusamy, Effect of Bhrāmārī Prāṇāyāma Practice on Pulmonary Function in Healthy Adolescents: A Randomized Control Study, *Ancient Science Life*.2017 Apr - Jun; 36 (4): 196-199, doi: 10.4103/asl. ASL_220_16.
- [5] Surbhi Amit Ranga, Study of the effect of yoga on blood pressure, blood glucose, and glycosylated hemoglobin levels of patients with Type 2 diabetes mellitus, *Natl J Physiol Pharm Pharmacol*.2021; 11 (4): 449 - 453, doi: 10.5455/njppp.2021.11.02056202110032021.
- [6] Uttio Gupta, Effectiveness of Yoga - based Exercise Program Compared to Usual Care, in Improving HbA1c in Individuals with Type 2 Diabetes: A Randomized Control Trial, *Int J Yoga*.2020 Sep - Dec; 13 (3): 233-238, Published online 2020 Sep 13. doi: 10.4103/ijoy. IJOY_33_20.
- [7] Vijay Pratap Singh, Effect of Yoga and Exercise on Glycemic Control and Psychosocial Parameters in Type 2 Diabetes Mellitus: A Randomized Controlled Study, *Int J Yoga*, 2020 May - Aug; 13 (2): 144 - 151. doi: 10.4103/ijoy. IJOY_45_19. Epub 2020 May 1.

- [9] Dipen R Damor, Yoga - asanas and pranayama: Is it helpful in the management of non - insulin - dependent diabetes mellitus, *Int J Med Sci Public Health*.2020; 9 (9): 540 - 543, doi: 10.5455/ijmsph.2020.09156202010102020.
- [10] Shanthi S, Influence of Pranayama and Selected Yoga - Asanas on Quality of Life and Certain Biochemical Parameters among Subjects with Type - 2 Diabetes Mellitus, *International Archives of Integrated Medicine*, Vol.6, Issue 8, August 2019, ISSN: 2394 - 0026 (P), SN: 2394 - 0034 (O).
- [11] Dr Manoranjan Tripathy, Immediate Effect of Nadi Shodhana Pranayama on Blood Glucose, Heart Rate and Blood Pressure, *Journal of American Science* 2019; 15 (5), DOI: 10.7537/marsjas150519.09.
- [12] Kalamadhuri Narayanapu, Effect of 12 - week pranayama in the management of type - 2 diabetes, *National Journal of Physiology, Pharmacy and Pharmacology*, 2018 | Vol 8 | Issue 5 January 11, 2018.
- [13] Sachin Khedikar, MANAGEMENT OF DIABETES MELLITUS THROUGH AASANA AND PRANAYAMA, *Research Gate*, October 2018, DOI: 10.24327/23956429. ijcmpr20180534
- [14] B C Bock, Feasibility of yoga as a complementary therapy for patients with type 2 diabetes: The Healthy Active and in Control (HA1C) study, *Complement Ther Med*, 2019 Feb; 42: 125 - 131. doi: 10.1016/j.ctim.2018.09.019. Epub 2018 Sep 26.
- [15] Jie Cui, Effects of yoga in adults with type 2 diabetes mellitus: A meta-analysis, *J Diabetes Investig*.2017 Mar; 8 (2): 201–209, Published online 2016 Sep 19. doi: 10.1111/jdi.12548.
- [16] Dr. Akanksha Srivastava, Effect of Yoga - Asanas and Pranayama on Diabetic Adults, *International Journal of Yoga and Allied Sciences* (ISSN: 2278 – 5159), Volume: 4, Issue: 2; July - Dec 2015.