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Efficacy of Selected Asana on Blood Glucose Level in Diabetic Women

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Abstract: ***Introduction: Elevated blood glucose levels are a hallmark of diabetes, a chronic metabolic illness brought on by either insufficient insulin synthesis or inefficient insulin utilization by the body. Diabetes is becoming more and more common worldwide, which presents a serious public health concern. Diabetes is acknowledged by the World Health Organization (WHO) as a serious health issue with an increasing worldwide impact. The World Health Organization reports that the prevalence of diabetes has been rising, impacting millions of people globally. Type - 2 diabetes is brought on by insulin resistance, dyslipidemia, abdominal obesity, and beta - cell dysfunction. Some important global diabetes statistics showed that 463 million persons had the disease. These numbers demonstrate the seriousness of diabetes as a public health concern and the need of continued efforts in prevention, early detection, and management. Yoga is an ancient practice that's becoming more and more popular among all ages, even younger ones. It's been shown to help with several health problems. To lower the risk of diabetes, some yoga poses stretch the pancreas, which can encourage the formation of beta cells that produce insulin. Yoga can be a useful addition to diabetes care. Objectives: Comparing the biochemical variables of fasting blood glucose and postprandial blood glucose in diabetic women 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. Materials and Methods: The study included thirty type - 2 diabetic women from the Chennai suburb of Mogappair. The number of participants in the yoga group and the control group was the same. The experimental group practiced selected asana - Ardha Matsyendrasana, Paschimottanasana, Ushtrasana, Dhanurasana, Padahastasana, Trikonasana, Pawanmuktasana and Savasana for 12 weeks. Conclusion: The findings support the theory that practicing particular asanas has considerably altered the fasting and postprandial blood glucose levels of diabetic women.***

Keywords: Diabetes, Fasting Blood Glucose, Postprandial Blood Glucose, Biochemical.

1. Introduction

A major global health concern is type - 2 diabetes mellitus, a common chronic metabolic disease. Diabetes is becoming more and more common, and the problems it causes add to the global burden of disease and mortality. Insulin resistance and insufficient insulin production are the main causes of type - 2 diabetes. The condition's start and progression are influenced by a complex combination of genetic predisposition, lifestyle variables, and environmental factors. Type - 2 diabetes has become a major public health concern due to its rising incidence worldwide, impacting millions of people in various demographic and age groups. The defining feature of this illness is the cells' decreased sensitivity to the hormone insulin, which is essential for allowing glucose to enter cells. Consequently, blood glucose levels increase, resulting in hyperglycemia. According to the International Diabetes Federation (IDF), the prevalence of diabetes in women worldwide as of my most recent information update in January 2022 was roughly 9.3%. Type 1 and type 2 diabetes are also included in this percentage. It's crucial to remember that the prevalence of diabetes can differ by area and be impacted by a number of variables, including age, lifestyle, heredity, and general health. Consequently, research into complementary and alternative methods of managing diabetes is becoming more and more popular, with an emphasis on lifestyle treatments.

Yoga and other forms of physical exercise are becoming more widely recognized as possible supplementary therapies for diabetes. Yoga is an age - old discipline with an emphasis on holistic health. It consists of a series of positions, or asanas, that incorporate breathing exercises, meditation, and regulated body movements. Yoga is a mind - body discipline with physical postures, breath control, and meditation that has its roots in ancient Indian traditions. During a yoga practice, the physical postures are referred to as "asana" explicitly. Beyond its cultural and historical relevance, yoga has attracted scientific attention due to its possible impacts on several health issues, including the complex mechanisms involved in glucose metabolism. Gheranda Samhita (Chapter 2, Verses 16–17) states that performing asanas regularly makes the body lighter and slimmer. It implies that doing asanas may lengthen the practitioner's life and aid in blood cleansing. According to Hatha Ratnavalli, a yogi who does yoga with awareness and focus can prevent disease and slow down the aging process. These writings offer distinctive viewpoints on physical postures and how they affect the practitioner's health. To help people, navigate the complexities of this common metabolic disorder, we hope to further the conversation about integrative approaches to diabetes management by recognizing and utilizing the therapeutic potential of yoga asanas. This will allow ancient wisdom and modern science to work in harmony.

2. Aims and Objectives

The purpose of this study is to provide important new information about how certain asanas affect the blood glucose levels of women with diabetes. By knowing how particular yoga postures may affect this population's glycemic control, customized interventions might be developed, improving diabetes management overall. This study recognizes the special physiological and hormonal factors that may affect how quickly diabetes progresses and how well patients respond to treatment by concentrating on female participants. A more sophisticated approach is offered by the examination of a few chosen asanas, which acknowledges that various yoga positions may have differing impacts on blood glucose levels. The study's chosen asanas were chosen for their potential utility and effectiveness in treating the physiological circuits related to glucose metabolism.

3. Materials and Procedures

A thorough explanation of the participants, variables, training methods, and statistical methods is provided below. Public announcements and marketing were used at different diabetic clinics for recruitment purposes. Study participants who met the inclusion criteria provided their informed consent before any data collection. The study comprised thirty individuals in all, who were split into two groups: the experimental group and the control group. Type - 2 diabetic individuals receiving oral allopathic medicine made up the experimental group, while diabetics receiving only allopathic medication comprised the control group. For both groups, standard blood sample techniques were used to measure fasting blood glucose (FBG) and postprandial blood glucose (PPBG). The experimental group was taught and practiced a few specific asanas, such as Ardha Matsyendrasana, Paschimottanasana, Ushtrasana, Dhanurasana, Padahastasana, Trikonasana, Pawanmuktasana, and Savasana for 60 minutes each day for12 weeks. In contrast, the control group did not engage in any physical activity. For each group, there was a pre - and post - test.

Statistical Procedure:
The data gathered from the experimental and control groups before and after the experiment, focusing on Blood Glucose levels like – Fasting blood glucose and Postprandial blood glucose, were evaluated to see if there were any statistically significant differences. This investigation made use of the F - ratio analysis of variance.

4. Results

Among all the subjects before the practice of the selected asanas like Ardha Matsyendrasana, Paschimottanasana, Ushtrasana, Dhanurasana, Padahastasana, Trikonasana, Pawanmuktasana and Savasana, the pre - test mean values of the control group and the experimental group for Fasting Blood Glucose is 118.20 mg/dl and Postprandial Blood Glucose is 156.86 mg/dl. The post - test mean values of the control group and experimental group for Fasting Blood Glucose are 134.80 and 94.93 mg/dl and Postprandial Blood Glucose is 169.86 and 130.20 mg/dl respectively. The outlined research hypothesis is approved as a result. The Adjusted post - test means of the Fasting Blood Glucose and Postprandial Blood Glucose tests are inferred to have a significant difference from one another.

5. Analysis of data

The results of the analysis of covariance on the Blood Glucose Levels like Fasting blood glucose and Postprandial blood glucose test results from the pre and post - tests were collated and are shown in tables.

Table 1: Analysis of Co - Variance of the Pre - Test and Post Test Means Of The Control Group And Experimental Group among Asana blood Glucose level in diabetic women for Fasting Blood Glucose Test

Group	Control	Experimental	Source of variance	Sum of squares	df	Mean square	'F' Ratio
Pre - Test Mean	118.20	118.20	Between	0.085	1	0.085	0.357 NS
SD	5.96	5.63	Within	942.800	28	33.671	
Post - test Mean	134.80	94.93	Between	11920.133	1	11920.133	27.18*
SD	8.27	4.44	Within	1235.333	28	44.119	
Adjusted Post - test mean	126.50	106.56	Between	3840.631	1	3840.631	42.60*
			Within	1864.96	28	68.504	

S – Significant
NS – Non - significant

It is inferred from the above table the pre - test mean score of the control group is 118.20, experimental group is 118.20. Therefore, it is evident that the obtained 'F' value is 0.357 for the Pre - Test mean score. Therefore, the framed research hypothesis is rejected. Also, the Post - test mean score on the control group is 134.80, experimental group is 94.93. Therefore, it is evident that the obtained 'F' value is 27.18 for the Post - Test mean score. As a result, the framed research hypothesis is accepted. It is inferred that there is a significant difference between the post - test means of the asana blood Glucose level in diabetic women for the Fasting Blood Glucose Test. Further, the above table takes into consideration the adjusted post - test mean score of the control group is 126.50, experimental group is 106.56. Consequently, it is evident that the obtained 'F' value is 42.60. Therefore, the framed research hypothesis is accepted. It is inferred that there is a significant difference between the adjusted post - test means of the asana blood glucose level in diabetic women for the Fasting Blood Glucose test.

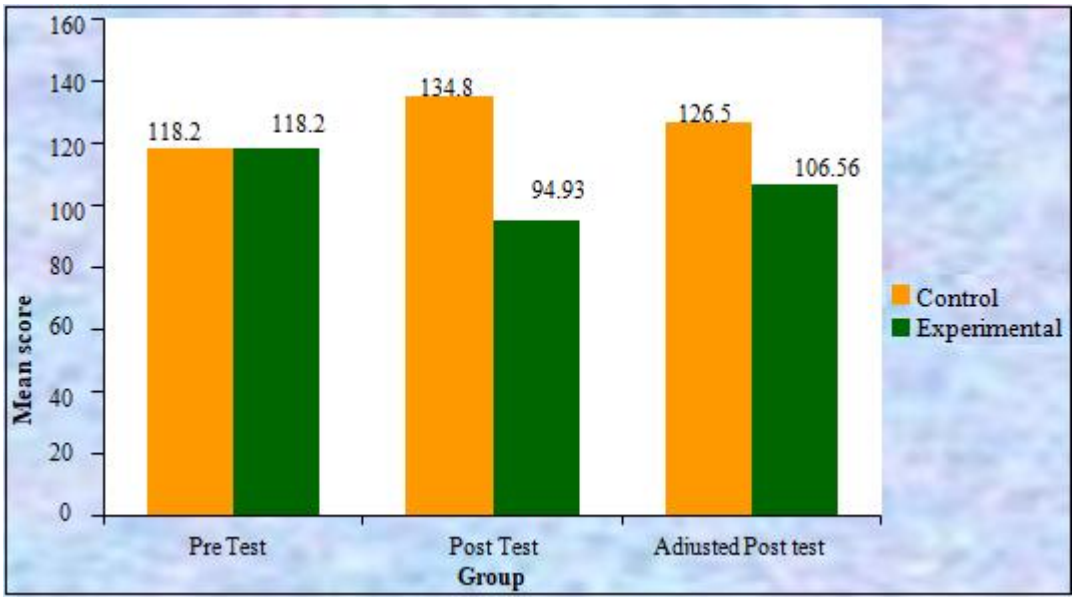


Figure 1: The graph shows the Pre - Test and Post - Test Means of The Control Group and Experimental Group on the Fasting Blood Glucose Test

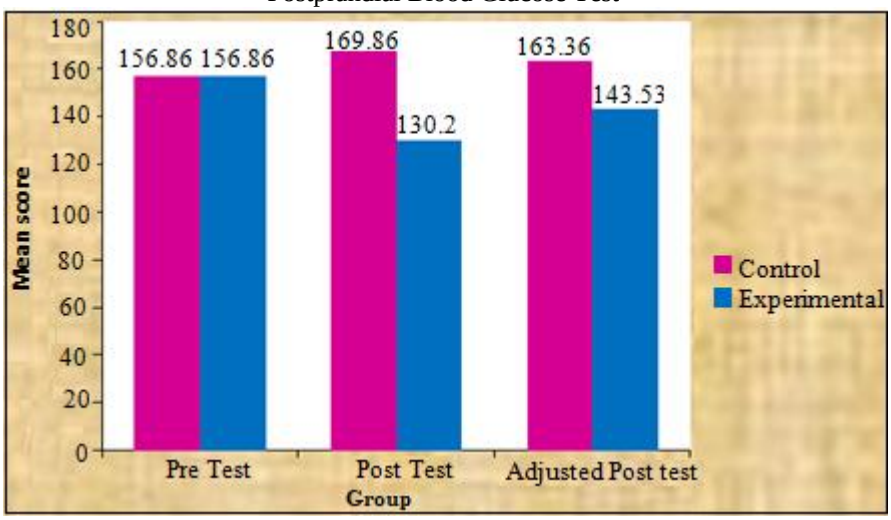
Table 2: Analysis of Co - Variance of the Pre Test and Post Test Means of the Control Group And Experimental Group among Asana blood Glucose level in diabetic women for Postprandial Blood Glucose Test

Group	Control	Experimental	Source of variance	Sum of squares	df	Mean square	**'F' Ratio**
Pre - Test Mean	156.86	156.86	Between	0.054	1	0.054	0.165 NS
SD	20.50	18.51	Within	10689.467	28	381.767	
Post - test Mean	169.86	130.20	Between	11800.833	1	11800.833	41.89*
SD	20.71	11.58	Within	7886.133	28	281.648	
Adjusted Post - test mean	163.36	143.53	Between	4836.150	1	4836.150	10.37*
			Within	8407.639	28	466.038	

S – Significant
NS – Non - significant

From the above table, the pre - test mean score of the control group is 156.86, experimental group is 156.86. Therefore, it is evident that the obtained 'F' value is 0.165 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 asana blood Glucose level in diabetic women for the Postprandial Blood Glucose Test. Also, the Post - test mean score on the control group is 169.86, experimental group is 130.20. Therefore, it is evident that the obtained 'F' value is 41.89 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 control group is 163.36, experimental group is 143.53. Therefore, it is evident that the obtained 'F' value is 10.37. Therefore, the framed research hypothesis is accepted. It is inferred that there is a significant difference between the adjusted post - test means of the asana blood glucose level in diabetic women for the Postprandial Blood Glucose test.

Table 2: The graph shows the Pre - Test and Post Test Means of The Control Group And Experimental Group on Postprandial Blood Glucose Test



6. Discussion on Findings

The study discussed observed from the above table result reveals that there is a significant difference between the post - test means of the asana blood Glucose level in diabetic women for the Fasting Blood Glucose Test. Consequently, it is evident that the obtained 'F' value is 42.60. Therefore, the framed research hypothesis is accepted. It is inferred that there is a significant difference between the adjusted post - test means of the asana blood glucose level in diabetic women for the Fasting Blood Glucose test. It was estimated that the significant difference in means was calculated before and after yoga training in the same group. A p - value of <0.05 was considered statistically significant. The reduction in these values at three months during the practice of selected asanas was highly significant when compared with mean values before yoga (p <0.001), but it was insignificant (p<0.05) in the control group. The results of the present study demonstrated that yoga is effective in reducing blood glucose levels in patients with fasting blood glucose.

Also based on the result proved that that there is no significant difference between the pre - test means of the asana blood Glucose level in diabetic women for the Postprandial Blood Glucose Test. To control blood glucose levels, numerous drugs are being invented and marketed for the benefit of diabetic patients. However, the use of such drugs has its drawbacks, such as drug dependency, drug resistance, and adverse effects, if used for a long time. Hence, in recent years there has been an intense search for non - medical measures not only to control but also to prevent its complications. However, there are few reports as regards to the influence of yoga on blood glucose levels. Hence, the present study was undertaken to assess the beneficial effects of yoga on blood glucose levels. In addition, yoga has a positive effect on general well - being and stress. Further, taking into consideration the adjusted post - test mean score on the control group experimental group is inferred that there is a significant difference between the adjusted post - test means of the asana blood glucose level in diabetic women for Postprandial Blood Glucose test.

7. Conclusion

The present study provides the required scientific basis and supports some of the advantages of practicing the chosen asanas, which include Ardha Matsyendrasana, Paschimottanasana, Ushtrasana, Dhanurasana, Padahastasana, Trikonasana, Pawanmuktasana, and Savasana. The desired changes were clear from the analyzed metrics, and they were. Blood glucose levels, both postprandial and fasting, significantly decreased in those who performed the chosen asanas for three months (PPBG). Asanas improve the function of glands, internal organs, and the body as a whole. They also help to build strength and flexibility, relax the nervous system, and stretch the muscles.

References

[1] Bilagi, Ashween, Intensive integrated yoga therapy on lipid profile, body composition, and insulin resistance among Type 2 diabetes mellitus, Yoga Mimamsa 54 (2): p 70 - 77, Jul–Dec 2022. | DOI: 10.4103/ym. ym_108_22.

[2] Dr. Vinu Bhaska, Effect of selected yogic asanas, surya namaskar, combination of surya namaskar and selected yogic asanas on blood glucose level of type - II diabetic, International Journal of Yogic, Human Movement and Sports Sciences 2021; 6 (1): 32 - 35.

[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. Epub 2021 May 25.

[4] 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, nt J Yoga.2020 Sep - Dec; 13 (3): 233–238, Published online 2020 Sep 13. doi: 10.4103/ijoy. IJOY_33_20.

[5] Vijay Pratap Singh and Bidita Khandelwal, Effect of Yoga and Exercise on Glycemic Control and Psychosocial Parameters in Type 2 Diabetes Mellitus: A Randomized Controlled Study, International Journal of Yoga 2020 May - Aug; 13 (2): 144–151, Published online 2020 May 1. doi: 10.4103/ijoy. IJOY_45_19.

[6] 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 - 543doi: 10.5455/ijmsph.2020.09156202010102020.

[7] K. Esha, Effect of Alternate Walking and Yoga on Blood Sugar Levels in Type 2 Diabetes, Indian J Physiol Pharmacol 2019; 63 (1): 16–20.

[8] 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, Available online at http: //iaimjournal. com/ ISSN: 2394 - 0026 (P), ISSN: 2394 - 0034 (O).

[9] Arkiath Veettil Raveendran, Therapeutic Role of Yoga in Type 2 Diabetes, Endocrinol Metab (Seoul).2018 Sep; 33 (3): 307–317, Published online 2018 Aug 14. doi: 10.3803/EnM.2018.33.3.307.

[10] Sachin G. Khedikar and Mukund P. Erande, Management of Diabetes Mellitus through Aasana and Pranayama, International Journal of Current Medical and Pharmaceutical Research ISSN: 2395 - 6429, September 2018DOI: http: //dx. doi. org/10.24327/23956429. ijcmpr20180534.

[11] Samyukta Kudigram and Akanksha NS, Effect of yoga therapy on fasting blood sugar and to study the distribution of anthropometric measures in type - 2 diabetes, International Journal of Complementary & Alternative Medicine, 2018; 11 (1): 44 - 47. DOI: 0.15406/ijcam.2018.11.00345.

[12] Praveen Angadi, Adherence to yoga and its resultant effects on blood glucose in Type 2 diabetes: A community - based follow - up study, Int J Yoga.2017 Jan - Apr; 10 (1): 29–36. doi: 10.4103/0973 - 6131.186159, PMCID: PMC5225741, PMID: 28149065.

[13] Upma Bhagat & Amarpreet Singh, Effect of diabetes

on daily life and the role of yogic activities on diabetes, International Journal of Yogic, Human Movement and Sports Sciences 2017; 2 (2): 338 - 340.
[14] Santhakumari Rajani, Beneficial Effects of Yogasanas and Pranayama in limiting the Cognitive decline in Type 2 Diabetes, Natl J Physiol Pharm Pharmacol.2017; 7 (3): 232–235. Published online 2016 Sep 24. doi: 10.5455/njppp.2017.7.0825508092016.
[15] Amit Singh, Effect of a Residential Integrated Yoga Program on Blood Glucose Levels, Physiological Variables, and Anti - Diabetic Medication Score of Patients with Type 2 Diabetes Mellitus: A Retrospective Study, Integrative Medicine International (2017) 4 (3 - 4): 181–186. https: //doi. org/10.1159/000487947.
[16] Surendra, BV, T. Hariprasad, Effect of pranayama and yogasanas on lipid profile in normal healthy volunteers, Artigo em Inglês | IMSEAR | ID: sea - 178728.
[17] T. Suseelal, Medical Impact of Yoga on Fasting Blood Glucose among Type - II Patients in Chennai region, Volume: 4 | Issue: 2 | February 2015 • ISSN No 2277 – 8179.
[18] Dr. Akanksha Srivastava1 & Dr. Ram Kalap Tiwari, 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.
[19] Kim E. Innes and Terry Kit Selfe, Yoga for Adults with Type 2 Diabetes: A Systematic Review of Controlled Trials, J Diabetes Res.2016; 2016: 6979370, Published online 2015 Dec 14. doi: 10.1155/2016/6979370
[20] Nisha Shantakumari, Effects of a yoga intervention on lipid profiles of diabetes patients with dyslipidemia, PMID: 23647889 PMCID: PMC3861018 DOI: 10.1016/j. ihj.2013.02.010.
[21] Madanmohan Trakroo, A comparative study of the effects of asana, pranayama and asana - pranayama training on neurological and neuromuscular functions of Pondicherry police trainees, Int J Yoga.2013 Jul - Dec; 6 (2): 96–103, doi: 10.4103/0973 - 6131.113398, PMCID: PMC3734645, MID: 23930027
[22] Dr. Balaji P. A., Effects of yoga - pranayama practices on metabolic parameters and anthropometry in type 2 diabetes, International Multidisciplinary Research Journal 2011, 1 (10): 01 - 04 ISSN: 2231 - 6302 Available Online: http: //irjs. info.
[23] Savita Singh, Influence of pranayamas and yoga - asanas on serum insulin, blood glucose and lipid profile in type 2 diabetes, Indian J Clin Biochem.2008 Oct; 23 (4): 365–368, Published online 2008 Dec 20. doi: 10.1007/s12291 - 008 - 0080 - 9.
[24] Varun Malhotra, The beneficial effect of yoga in diabetes, Nepal Medical College Journal, 2005 Dec; 7 (2): 145 - 7.
[25] Varun Malhotra, Effects of yoga asanas and pranayama in non - insulin - dependent diabetes mellitus, May 2004 Indian Journal of Traditional Knowledge 3 (2): 162 - 167.