



Effect of yogic practices on glycated haemoglobin (Hba1c) level of type II diabetes mellitus in urban adults

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Abstract

The objective of the study to examine the effect of Yogic Practices on Glycated Haemoglobin (HbA1C) level of Type-II Diabetes Mellitus in Urban Adults. This study has been conducted in Delhi NCR. 40 participants were selected through purposive sampling from Navadha Yoga Health Care Institute. Pre-Post experimental control group research design has been used in this study. The duration of yogic intervention was twelve weeks (except Sunday and government holidays). The result revealed that the effect of Yogic Practices have significant effect on Glycated Haemoglobin (HbA1C) level of Type-II Diabetes Mellitus in Urban Adults.

Key Words: *Yogic Practices, HbA1C Level, Type II Diabetes, Urban Adults.*

Introduction

Type II diabetes Mellitus is a common lifestyle disorder caused by insulin resistance with relative or absolute insulin deficiency, resulting in chronic hyperglycaemia and various cardiovascular complications. Globally, according to the Diabetes Atlas of the International Diabetes Federation (eighth edition, 2017), reported about 425 million people had diabetes, a figure that is expected to increase to 629 million in 2045. Sedentary habits and unhealthy eating habits are the main risk factors for the development of various lifestyle disorders, including diabetes. Psychological stress also increases the risk and severity of diabetes. It has been found that physical activity increases the risk of diabetes by 3 times and the risk of coronary heart disease by 2.4 times. Dietary treatment for people with diabetes and other lifestyle disorders, such as obesity, hypertension and dyslipidaemia. Urbanization, the consumption of high-calorie foods, the use of several machines, a less open space for exercise, a modern and busy lifestyle and a lack of motivation. In addition, people with diabetes have a reduced ability to exercise due to their excess weight, their physical condition, their sedentary lifestyle, their limited joint mobility and other complications related to Type-II diabetes,

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However, man has now realized the vital role of ecological virginity and environmental purity for his healthy and happy existence. Consequently, including cardiovascular disease, peripheral neuropathy and diabetic foot problems. Several studies have shown that there are few limits to the implementation of non-drug treatments for diabetes. Kudigra *et al.* (2018), studied "Effect of yoga therapy on fasting blood sugar and to study the Distribution of Anthropometric Measures in Type-2 Diabetes." and found that yoga practices are effective in reducing the fasting blood sugar levels in type 2 diabetes mellitus patients. Whereas Innes and Selfe (2016), studied "Yoga for Adults with Type 2 Diabetes: A Systematic Review of Controlled Trials" and found that yogic practices may promote significant improvements in several indices of importance in Type 2 Diabetes. And also Chimkode *et al.* (2015), studied "Effect of yoga on blood glucose levels in patients with type 2 diabetes mellitus" and found that yoga is effective in reducing the blood glucose levels in patients with T2DM. Jyotsna *et al.* (2014), studied "Completion report: Effect of Comprehensive Yogic Breathing program on type 2 diabetes: A randomized control trial" and found randomized control trial points towards the beneficial effect of yogic breathing program in preventing progression of cardiac neuropathy. M. Bindra *et al.* (2013), studied "Influence of



pranayama's and yoga-asana's on blood glucose, lipid profile and HbA1c in type 2 diabetes," and Results showed a significant improvement of all biochemical parameters of Diabetic patients.

Hegde *et al.* (2012), studied "Effect of 3-month yoga on oxidative stress in type 2 diabetes with or without complications: a controlled clinical trial" and found that, Yoga can be used as an effective therapy in reducing oxidative stress in type 2 diabetes. Yoga in addition to standard care helps reduce BMI and improve glycemic control in type 2 diabetic patients and Amita *et al.* (2009), studied "Effect of yoganidra on blood glucose level in diabetic patients". Results of this study suggest that subjects on Yoga-nidra with drug regimen had better control in their fluctuating blood glucose and symptoms associated with diabetes, compared to those were on oral hypoglycaemic alone. Alexander *et al.* (2008), studied "Contextualizing the effects of yoga therapy on diabetes management: a review of the social determinants of physical activity" and identify the effects of yoga-based therapy on the management of type 2 diabetes mellitus and found that yoga has a positive short-term effect on multiple diabetes-related outcomes. Innes and Vincent (2007), studied "The influence of yoga based programs on risk profiles in adults with type 2 diabetes mellitus: a systematic review" and found Yoga may improve risk profiles in adults with Type 2 DM.

Sahay (2007), studied "Role of yoga in diabetes" and found that yogic practices have a role in the prevention of diabetes. There is a beneficial effect on the co-morbid conditions like hypertension and dyslipidaemia. Malhotra *et al.* (2006), studied "The beneficial effect of yoga in diabetes" and found a significant decrease in waist-hip ratio and changes in insulin levels were also observed, suggesting a positive effect of Yoga asanas on glucose utilisation and fat redistribution in NIDDM. Yoga asanas may be used as an adjunct with diet and drugs in the management of Type 2 diabetes. Sahay and Sahay (2002), Studied "Lifestyle modification in management of diabetes mellitus" and found Exercise includes yoga practices which have a role to play in the prevention of type 2 diabetes.

Materials and Methods

Variables and Description

Dependent Variables

Glycated Haemoglobin (HbA1C)

Glycated Haemoglobin is a form of Haemoglobin that is chemically linked to a sugar. The usual sugar is glucose and the construction of the Hb-sugar bond indicates the presence of excess sugar in the blood stream, often indicative of diabetes. HbA1C is of particular interest because it is easier to detect. It is mainly measured to determine the average blood sugar level for three months and can be used as a diagnostic test for diabetes mellitus and as an assessment test for glycaemic control in people with diabetes. For people without diabetes, the normal range for Haemoglobin A1C is between 4% and 5.7%. Levels of HbA1C between 5.7% and 6.4% indicate a greater probability of getting diabetes. Levels equal to or greater than 6.5% indicate that you have diabetes.

Type II Diabetes Mellitus

Type II (non-insulin-dependent) diabetes is characterized by insulin resistance or abnormal insulin secretion, each of which may predominate. The diabetes epidemic is particularly related to type II diabetes, and is occurring in both developed and developing countries mainly due to demographic changes and increased longevity. In developing countries, demographic changes leading to type II diabetes include lower birth rates and lower mortality from infectious causes. Type II diabetes accounts for over 90% of cases worldwide. Type II diabetes mellitus is a metabolic disorder in which blood sugar levels increase over a prolonged period. According to the International Diabetes Federation, India has more diabetic patients than any other country in the world. Our lifestyle is well associated with the development of type II diabetes mellitus and lifestyle modification is the cornerstone of its management. The proposed research study were mainly focused on the Type II Diabetes Mellitus in Urban Adults.

Independent Variables

- Sodhankriya
- Asana
- Pranayama
- Yoganidra
- Fasting (once a week)



Shodhankriya, Asana and Pranayama: Shodhankriyas are very effective in internal cleansing of body and increase digestion. It is beneficial in sustaining plasma blood sugar level in human body. Whereas Surya Namaskara and Asana's keep balance human body muscles activity and fat ratio. Pranayama's play a vital role in the gaseous exchange in the body.

Yoganidra: According to Swami Satyanand Saraswati, people feel relaxed when they collapse in an armchair with a drink or a cigarette and read a newspaper or turn on the television. But this, in reality, is simply sensory entertainment; True relaxation is an involvement that goes far beyond all this. For absolute relaxation, you need to be careful. This is Yoga Nidra, the state of dynamic sleep. It includes many uses of this multipurpose technique that has been used for deep relaxation, for educational purposes and to harmonize the deeper unconscious.

Fasting: Fasting is a very influential rituals of Indian culture that improves natural autophagy in human body. Autophagic dysfunction is associated with obesity and type 2 diabetes. However, the mechanisms underlying the cause of the autophagic defect in metabolic disorders remain elusive but its role found vital in diabetic care and management of modern day's lifestyle caused problems.

Spiritual Counseling: Spiritual counseling is a modern form of therapy that integrates spirituality into its treatment. While therapy and spirituality have remained separate in the past, therapists are beginning to see the value that spiritual beliefs play important role in the healing process. This type of therapy can help you find a sense of meaning in your life and explore your spiritual beliefs. While traditional therapy is generally limited by science, spiritual counseling includes the belief in greater power in its tactic.

Hypothesis: On the basis of review of literatures a directional hypothesis used in the proposed research work.

- There is significant difference in Glycated Haemoglobin (HbA1C) level between Type-II Diabetic patients performing Yogic practices and who do not performing Yogic practices.

Research Design

Pre-test Post-test Experimental Control group research design has been used in the study.

Sample and Sampling

40 participants age group of (35-55 years) were selected through purposive sampling. Sample were divided into two groups- Experimental and Control. 20 participants were in Experimental group and 20 participants were in Control group.

Inclusion Criterion

- Aged between 35 -55years male and female.
- Those who were able to join program for the proposed time period.
- Participants who were regular for the proposed time period of Yogic intervention.

Exclusion Criterion

- Participants who were suffering from type-I diabetes.
- Handicapped persons who cannot practice Yogic intervention.
- Participant who were not able to follow the proposed Yogic intervention.
- Pregnant females.
- Subjects suffering from disorders like: Liver disease, Pulmonary Tuberculosis, Malabsorption, Thyrotoxicosis, severe cardiac problems, Retinopathy etc. were excluded from the study.

Tools

For the proposed research work following tools were used.

- Roche cobas c311 Analyzer: to measure Glycated Haemoglobin (HbA1C) level.

Intervention Time Duration: 60 minutes

1. Prayer
2. Sodhankriya: 10 minutes
 - Kunjal - twice a week.
 - Vatkrum Kapalbhathi- 3 rounds (60 strokes in each round)
 - Agnisar- 3 rounds (5-10 times in each round)
3. Asana: 25 minutes
 - Suryanamaskar – (2 round)
 - Ushtrasana
 - Paschimottanasana
 - Ardhamatsyendrasana
 - Mandukasana
 - Bhujangasana
 - Pawanamuktasana
 - Shavasana
4. Pranayama: 10 minutes
 - Nadisodhan Pranayama



- Bahyavritti Pranayama (Nishshesharechaka)
- 5. Yoganidra: 10 minutes
- 6. Spiritual counseling: 5 minutes
- 7. Shanti Patha

Dietary Advice

- All the participants were advised to keep fast once a week.
- All the participants were advised to take vegetarian diet only.
- Participants were strictly advised to avoid smoking and consumption of alcohol.

Procedure

We contacted the participants personally and after developing a good rapport we introduced our research and its purpose and after taking proper consent, we collected the pre-intervention data of Glycated Haemoglobin (HbA1C) level of experimental group and control group. After that, have given yogic intervention to the experimental group participants for 12 weeks and control group participants being observed without any yogic

intervention. All the Yogic practices were taught to the experimental group during the first 2 weeks and followed up by remaining 10 weeks. Daily Yogic intervention was given to the group for 60 minutes per day in morning time (except Sunday and government holidays). After completion of time period of 12 weeks, we took the post test of Glycated Haemoglobin (HbA1C) level of both group participants. Lastly, we compare the results of pre-intervention values and post-intervention values of experimental group and control group and analysed further.

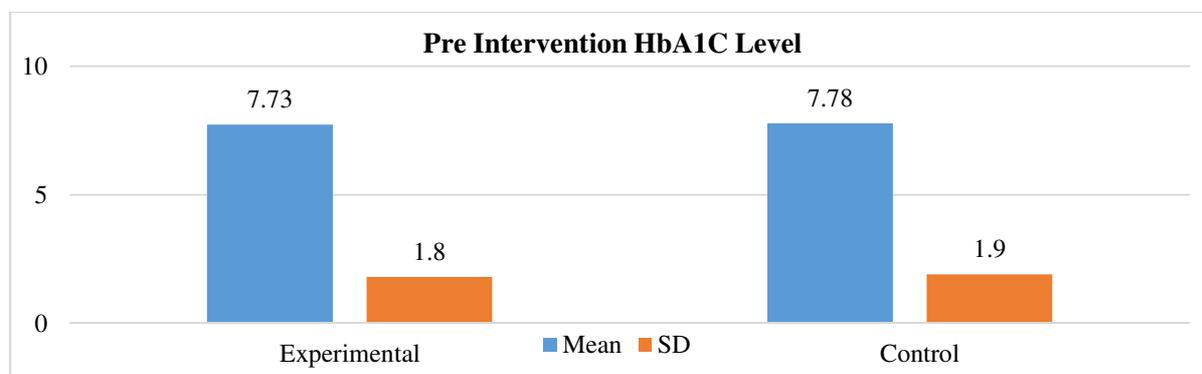
Results and Discussions

Table 1 and Graph 1, indicates that there is no significant difference of Glycated Haemoglobin (HbA1C) level in the Experimental group pre-test mean value (M=7.73) and Control group pre-test mean value (M=7.78) at the both 0.01 and 0.05 level of confidence (t=0.85). Thus, our pre samples of both the groups were identical and ideal.

Table 1: Comparison between Pre intervention of Glycated Haemoglobin (HbA1C) level of experimental group and control group (Mean, SD and ‘t’ value).

Group	N	Mean	SD (X x 10)	‘t’
Experimental	20	7.73	1.8	0.85 (NS)
Control	20	7.78	1.9	

(NS - Non Significant at any level)



Graph 1: Represents comparison between Pre intervention Glycated Haemoglobin (HbA1C) level of experimental and control group, (Mean and SD value).

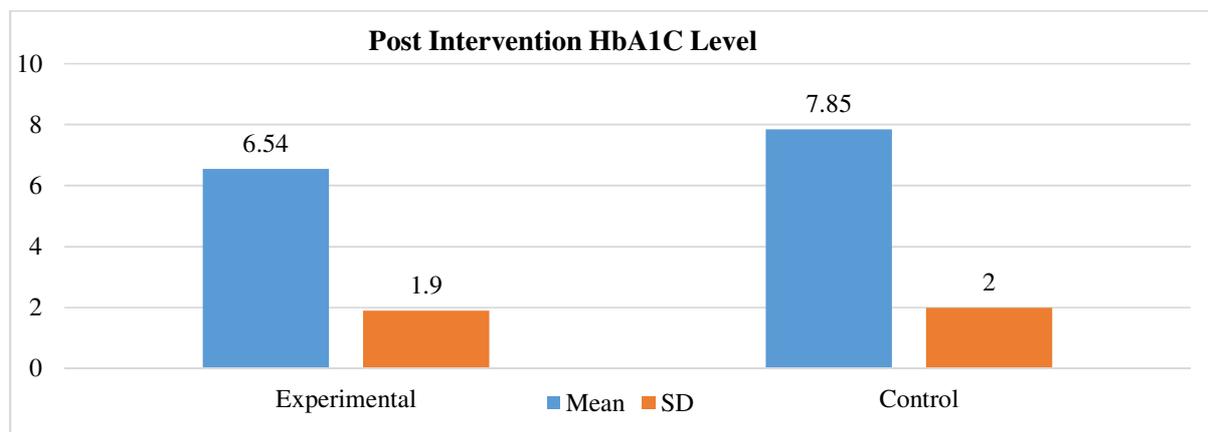
Table 2: Comparison between Post intervention Glycated Haemoglobin (HbA1C) level of experimental and control group (Mean, SD and ‘t’ value).

Group	N	Mean	SD (X x 10)	‘t’
Experimental	20	6.54	1.9	20.74**
Control	20	7.85	2.0	

(** - Significant at 0.01 level)



Effect of yogic practices on glycated haemoglobin



Graph 2: Represents comparison between Post intervention Glycated Haemoglobin (HbA1C) level of experimental and control group, (Mean and SD value).

Table 2 and Graph 2, indicates that there is significant difference of Glycated Haemoglobin (HbA1C) level in the experimental group. In the favour of experimental group where the level of Glycated Haemoglobin (HbA1C) level in experimental group is lower than the control group. The mean value of experimental group (M=6.54) and Control group mean value (M=7.85) found significantly at 0.01 level of confidence ($t=20.74$, $p<0.01$). Thus our hypothesis retained positively.

Conclusion

Based on our findings, there is 1.19 point decline in Glycated Haemoglobin (HbA1C) level in the experimental group where-as 0.07 point rise in control group. So that it can be concluded that twelve weeks of comprehensive yogic practice which includes Sodhankriya, Asana, Pranayama, Relaxation and vegetarian diet has been found to be very impactful in reducing and controlling of the Glycated Haemoglobin (HbA1C) level in the experimental group participants of Type II Diabetes Mellitus. So it is suggested that yoga should be encouraged and incorporated in our daily lives. It can manage diabetes and promote better health to the diabetic patients.

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References

- Alexander, G.K., Taylor, A.G., Innes, K.E., Kulbok, P. and Selfe, T.K. 2008. Contextualizing the effects of yoga therapy on diabetes management: a review of the social determinants of physical activity. *Family & community health*, 31(3): 228.
- Amita, S., Prabhakar, S., Manoj, I., Harminder, S. and Pavan, T. 2009. Effect of yoganidra on blood glucose level in diabetic patients. *Indian Journal of Physiology and Pharmacology*, 53(1): 97-101.
- Bindra, M., Nair, S. and Darotiya S. 2013. Influence of pranayamas and yoga-asanas on blood glucose, lipid profile and HbA1c in type 2 diabetes. *International Journal of Pharma and Bio Sciences*, 4(1):169-172.
- Chimkode, S. M., Kumaran, S. D., Kanhere, V. V. and Shivanna, R. 2015. Effect of yoga on blood glucose levels in patients with type 2 diabetes mellitus. *Journal of Clinical and Diagnostic Research: JCDR*, 9(4): CC01.
- Hegde, S.V., Adhikari, P., Kotian, S., Pinto, V.J., D'Souza, S. and D'Souza, V. 2012. Effect of 3-month yoga on oxidative stress in type 2 diabetes with or without complications: a controlled clinical trial. *Diabetes Care*, 35(4): 939.
- Innes, K.E. and Vincent, H.K. 2007. The influence of yoga based programs on risk profiles in adults with type 2 diabetes mellitus: a systematic review. *Evidence Based Complementary Alternative Medicine*, 4(4): 469-86.
- Innes, K.E. and Selfe, T.K. 2016. Yoga for Adults with Type 2 Diabetes: A Systematic Review of Controlled Trials, *Journal of Diabetes Research*, 2016.
- Jyotsna, V.P., Dhawan, A., Sreenivas, V., Deepak, K.K. and Singla, R. 2014. Completion report: Effect of Comprehensive Yogic Breathing program on type 2 diabetes: A randomized control trial. *Indian Journal of Endocrinal Metabolism*, 18(4): 582-584.



Kumar and Bhardwaj

- Kudigra, S., Venkatram and Akanksha, N.S. 2018. 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*, 11(1): 44-47.
- Malhotra, V., Singh, S., Tandon, O.P. and Sharma, S.B. 2005. The beneficial effect of yoga in diabetes. *Nepal Medical College Journal*, 7(2):145-147.
- Sahay, B.K. and Sahay, R.K. 2002. Lifestyle modification in management of diabetes mellitus. *Journal of Indian Medicine Association*, 100(3): 178-180.
- Sahay, B.K. 2007. Role of yoga in diabetes. *Journal of the Association of Physicians of India*, 55:121-126.

