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The Effect of 8 Weeks of Yogic Practice on Type-II Diabetes Mellitus and Hemoglobin among 45–55 Age Groups

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Abstract

The purpose of the study was to access the effect of 8 weeks of yogic practice on Type-II diabetes mellitus and hemoglobin among 45–55 age groups. The present study is undertaken among 10 urban peoples, for example, five experimental groups and five control groups. They were selected randomly from rural area of Assam who recently use to practice yoga asanas regularly during the morning time for 1.30 h. A randomized single-group design was adopted in this study. The volunteers were made aware of testing and training procedure. For the collection of the data, blood glucose was measured using (Accu-Chek active blood glucose meter) and hemoglobin level was measured using (StatStrip hemoglobin and hematocrit meter system). To evaluate the hypothesis of the study, descriptive statistics such as mean, SD, and compare mean such as paired "*t*"-test were applied and were tested at 0.05 level of significant. The statistical findings revealed that there was a significant difference in blood glucose and hemoglobin of the subjects. The blood glucose level of the experimental group *P* value and *t* value was 0.001 and 2.7764 and the control group *P* value and *t* value was 0.969. Hemoglobin level of the experimental group *P* value and *t* value was 0.002 and 2.7764 and the control group *P* value and *t* value was 0.883, respectively. On the basis of the statistical result, it was concluded that there was a significant effect of 8 weeks of training on blood glucose and hemoglobin among the age group of 45–55 years.

Keywords: Hemoglobin and hematocrit meter system, Type-II diabetes mellitus, Hatha Yoga

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Introduction

The word yoga is derived from the Sanskrit root Yuj meaning to bind, join, attach, and yoke, to direct and concentrate one's attention on, and to use and apply. It also means union or communication. It is the true union of our will with the will of God. In thus means, says Mahadev Desai in his introduction to the Gita according to Gandhi, "the yoking of all the powers of body, mind and soul to God; it means the disciplining of the intellect, the mind, the emotions, and the will, which that yoga pre-suppose; it means a poise of the soul which enables one to look at life in all its aspects greatly (Iyangar, 1985). Conventionally, Lord Shiva is regarded as the Original founder of yoga. Yoga has become increasingly popular in Western cultures as a means of exercise and fitness training. Yoga asana has several exercises or postures that work wonders on fitness and health. Varying widely in application and style, these exercises (postures) gently stretch and explore all parts of body. Yoga asana boosts physical strength, stamina and flexibility, improves blood circulation, enhances posture and muscle tone, and bestows greater powers of concentration and self-control.

Through the practice of yoga, we become aware of the connection between our emotional, mental, and physical levels. The pancreas is a gland that is located in the abdomen next to the small intestine. It produces and releases insulin into the bloodstream, helping the body to control how it uses food for energy. It also regulates the body's glucose level. Insulin moves glucose from the blood into the muscles to be used for energy. It also helps the liver absorb glucose and store it for when it is needed. Type 1 diabetes occurs when the immune system attacks the beta cells in the pancreas, causing them to no longer produce insulin. Type 2 diabetes starts when the body's fat, muscle, and liver cells are unable to process glucose. The pancreas reacts by producing extra insulin, but eventually can no longer produce enough of it. As a result, the body can no longer naturally control blood glucose levels.[1] Diabetes causes complications such as blindness, kidney failure, stroke, heart disease, hypertension, and circulatory disorders, leading to amputation of toes, feet, and legs ultimately causing premature death. There is a way to reverse diabetes that regular practice of hatha yoga may help the diabetes. The application of therapeutic hatha yoga to reverse incurable disease is relatively unknown in the west, but that is changing, endocrinologist and author of Quantum Healing, combines Western medical technology with Ayurvedic medicine and a significant part of his patient's treatment includes this form of yoga. Performing the yoga posture daily for 5 months eliminated the need to take insulin or any antidiabetic medications. Person who had required 75 units of insulin daily who kept alive but not healthy but hatha yoga put the person back on the road good to health. Certain postures have a therapeutic effect on various organ and gland. Those posture that benefit the pancreas and its functions are of the greatest interest to diabetics and pre-diabetics. All diabetics know that daily aerobic exercise helps control blood sugar and improve circulation because poor circulation is a major complication of diabetes. For some adult onset diabetics, proper diet and exercise are all that's required to regulate normal blood sugar. Backward bending postures such as the bhujangasana, salabhasana, dhanurasana, and ustrasana

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bring stimulation to the pancreas, as they exercise the erector spinae, latissimus dorsi, obliques, deep intertransversarii, and posterior abdominal wall. Furthermore, most of these postures cause the internal viscera to stretch, bringing stimulation to the pancreas and other glands and organs that otherwise receive no stimulation. Other postures such as ardhakurmasana, sasangasana, and paschimottasanasana provide stimulation and rejuvenation to the cells of the pancreas and other endocrine glands by way of compression. Compression of these glands, followed by relaxation, causes an increased volume of highly oxygenated blood to reach the cells, bringing nourishment that rejuvenates atrophied cells.[2]

Since stress further complicates diabetes, the calmative effects of performing hatha yoga and the specific practice of savasana at correct intervals also contribute to the reversal of this so called chronic, incurable disease. The physical side of yoga will also improve the lives of people with diabetes as well as help fight it. Exercise (along with diet and medication) has been a foundation of diabetes management. Yoga asana is often mentioned as a great form of exercise for diabetes patients, as it rejuvenates pancreatic cells, promotes weight loss, exercises the muscles, and improves mental attitude. Basically, certain yoga postures can promote the production of insulin-producing beta cells, increase glucose uptake in muscular cells, improve weight control, and help to create the right mental approach when it comes to dealing with diabetes. The yogic treatment restores the normal functioning of the pancreas and other glands of the endocrinal system. When these glands begin to function properly, the individual is fully cured of the diabetic disorders and health is restored to a normal level. The patient should continue to take diabetic medications, but after 3 weeks of regular practice can gradually reduce it, with the end result being to stop taking it all together. The patients with diabetes will found that after around 3 months, they were completely cured. Medicinal treatment for diabetes gives diabetes patients the insulin that their pancreas no longer produces, but never actually cures them of the disease. Almost every yoga pose has some sort of therapeutic effect on various organs and glands, including the pancreas. By choosing to do asanas that help revive the normal function of the endocrinal system, you can help restore the normal functioning of the pancreas. In the beginning, it is best to stick with asanas that are easily performed and progress as your energy levels, flexibility, and strength increase. We will get more into details on what yoga poses are best for diabetes later.[3]

Aim of the Study

The aim of the study was to investigate the effect of 8 weeks of yogic practice on Type-II diabetes mellitus and hemoglobin among 45–55 age groups.

Materials and Methods

Design of the Study

A randomized group design was most appropriate design for study. Experimenting on blood glucose level and hemoglobin level of two groups, that is, one experimental group and one control group will be formed. Each group will contain five subjects. The control group in the experimentation was taken all their daily lifestyle activities as usual while the experimental group will additionally go for yogic practice for 5 days in a week**.**

Volunteer of the Study

For the purpose of the study the total 10 (N-10) rural people were selected randomly from Village kamarkuchi (Dist Kamrup) of Assam and they were divided into 05 experimental group and 05 control group. They were selected randomly from Village Kamarkuchi (Dist. Kamrup) of Assam. The ages of the volunteer were from 45 to 55 years (52.6 ± 4.31). All the volunteers use to practice yoga asana regularly during the morning time for 1.30 h and they were requested in the testing in the testing and training procedure wholeheartedly and utmost sincerity in the experiment.

Delimitation of the Study

The following criteria were adopted in the study:

- Delimitation to the blood glucose and hemoglobin variable.
- Confined to Kamrup District of Assam (India)
- Age range from 45 to 55 years.
- The study was restricted to the practice of selected asana (Tadasna, Triyak Tadasana, Pada Hasatasana, Hasta Utasnasana, Trikonasana I, Trikonasana II, Paschimotanasana, Vakrasana, Matsyendrasana, Ustrasana, Ekpada Pawanmuktasana, Pawanmuktasana, Naukasana, Bhugangasana, Dhanurasana, and Sasangasana), pranayama (Anulom Vilom, Bhastrika and Kapalbhati), and meditation (concentration on breathing and vibration after chanting AUM in Padmasana or Sukhasana with Gyan Mudra, Apana Mudra, and Surya Mudra).

Limitation of the Study

- Medication, diet, daily routine and habits, etc., that might have an effect on the result of the study were considered as a limitation.
- Hereditary factors and genetic factors considered as limitation of the study.
- The psychological factor also excluded from the study.

Results

To compare the significance of mean difference of blood glucose variables between pre-test blood glucose level and post-test of blood glucose level of the volunteer, the mean and standard deviation were computed and difference between the mean of both the control group and experimental group on blood glucose level was tested for significance using paired sample "*t*"-test. The results are presented in the following tables.

Table 1 reveals that the value of mean and standard deviation of the experimental group before and after training program was 400.60 ± 59.049 and 166.00 ± 21.794, respectively. The mean and standard deviation of the control group before and after training program was 339.20 ± 65.151 and 339.60 ± 43.730, respectively. The mean blood glucose level of the experimental group in their post-test is smaller than their pre-test whereas the mean blood glucose level of the control

Table 1: Descriptive analysis of mean and standard deviation of the experimental and control group on blood glucose level

Group test	*Mean*	*N*	*SD*	*SEM*
Experimental control				
Pre-test	400.60	05	59.049	26.408
Post-test	166.00	05	21.794	9.747
Pre-test	339.20	05	65.151	29.137
Post-test	339.60	05	43.730	19.557

group in their post-test is greater than their pre-test. Smaller the mean, higher the performance.

Table 2 reveals that significant difference was found between the mean score of the experimental group (pre and post) in relation to different yogic practice on blood glucose level as the calculated *t*-value was found 8.554 which was higher value than the required value (2.7764) at 0.05 level of significance. It indicates that significant difference was not found between the mean score of the control group (pre and post) in relation to different yogic practice on blood glucose level as the calculated *t*-value was found −0.041 which was lower value than the required value (2.7764) at 0.05 level of significance.

Table 3 reveals that the value of mean and standard deviation of the experimental group before and after training program was 9.7400 ± 1.203 and 13.040 ± 0.503, respectively. The mean and standard deviation of the control group before and after training program was 10.480 ± 0.965 and 10.500 ± 0.837, respectively. The mean total hemoglobin level of the experimental group in their post-test is higher than their pre-test whereas the mean total hemoglobin level of the control group in their post-test is greater than their pre-test. Higher the mean score of post-test is greater the performance.

Table 4 reveals that significant difference was found between the mean score of the experimental group (pre and post) in relation to different yogic practice on hemoglobin level as the calculated t-value was found 7.693 which was higher value than the required value (2.7764) at 0.05 level of significance. It indicates that significant difference was not found between the mean score of the control group (pre and post) in relation to different yogic practice on hemoglobin level as the calculated *t*-value was found −0.156 which was higher value than the required value (2.7764) at 0.05 level of significance.

Table 2: Paired sample "t"-test of the experimental and control group on blood glucose level

Group test	*Mean*	*SD*	*SEM*	*t*	*df*	*Sig. (two tailed)*
Experimental group						
Pre-test-post-test	234.60	61.329	27.427	8.554	4	0.001
Control group						
Pre-test-post-test	−0.4000	21.9841	9.832	−0.041	4	0.969

*>Significant at $t(4)_{0.05/2}$=2.77

Table 3: Descriptive analysis of mean and standard deviation of the experimental and control group on hemoglobin level

Group test	*Mean*	*n*	*SD*	*SEM*
Experimental group				
Pre-test	9.7400	05	1.203	0.53814
Post-test	13.040	05	0.503	0.22494
Control group				
Pre-test	10.480	05	0.965	0.43174
Post-test	10.500	05	0.837	0.37417

Table 4: Paired samples "t"-test of the experimental and control group on hemoglobin level

Group test	*Mean*	*SD*	*SEM*	*t*	*df*	*Sig. (two tailed)*
Experimental group						
Pre-test-post-test	−3.300	0.959	1.572	7.693	4	0.002
Control group						
Pre-test-post-test	−0.0200	0.286	0.128	0.156	4	0.883

*>Significant at $t(4)_{0.05/2}$=2.77

Discussion

The above finding of glucose level shows the positive effect on glucose utilization in individuals with type 2 diabetes. The significant difference was found between the mean score of the experimental group (pre and post) in relation to different yogic practice on blood glucose level, which means reduction of glucose level is occurred in type 2 diabetes patient. This may be the result of continuity in training which was given to the subject in the training programmed was helpful to exert significant reduction of blood glucose. In patients with diabetes, pancreatic cells may be rejuvenated and pancreatic β-cell sensitivity may be increased by the alternating abdominal contractions and relaxations involved in yoga practice. Hence, improved in blood supply to muscles may enhance insulin receptor expression in the muscles; causing increased glucose uptake. The number of insulin receptors was also increased. There was an improvement in insulin sensitivity and decline in insulin resistance.[4] All these suggest that yogic practices have a role even in the prevention of diabetes.

The findings of hemoglobin level show that significant difference was found between the mean score of the experimental group (pre and post) in relation to different yogic practice on hemoglobin level of 45–55 age groups. Asana also increases the myoglobin pigment which is helpful to supply more amount of oxygen. Apparent increase in the concentration of red blood corpuscles is due to mobilization of plasma from blood to tissue fluid.[5] Besides this, yogic asana, pranayama, and exercise make a greater amount of oxygen supply thus putting into circulation the red blood corpuscles stored in spleen and accessory spleen. The reason for increased hemoglobin level can be explained by two different mechanisms; it may be due to hypoxia that releases more erythropoietin during yoga practices and second is that yoga practices increased release of iron stores from reticuloendothelial cells and splenic concentration enhances the release of reserved RBCs and all the aforementioned factors and the continuity of instruction provided to the Volenteers in the training programme, the haemoglobin level significantly improved.

Conclusion

On the basis of the data collection and limitation of the study, it was concluded that this result is helpful to the reason that the present sample was exposed to the reason to the type of training for the 1st time and the program chosen was difficult for them. Hence, in all the parameters, there has been improvement. Time constraint was another factor. This study can be taken as a preliminary assessment in the regard.

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