Journal of Advances in Science and Technology

Vol. 10, Issue No. 21, February-2016, ISSN 2230-9659

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AN INTERNATIONALLY INDEXED PEER REVIEWED & REFEREED JOURNAL

www.ignited.in

Journal of Advances in Science and Technology
Vol. 10, Issue No. 21, February-2016, ISSN 2230-9659

Comparative Effect of Selected Yogic Practices on Blood Sugar and Urine Sugar Levels of Diabetic Patients (Type I and II)

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Abstract – Diabetes as a health issue in India is no more confined to selected population. Today it is highly endemic among Indian populations and because of dietary habits, life style etc. With growing economic power the working middle class has changed more in this term. This as a result, health hazards from Diabetes has increased multi fold. Researcher considered this very aspect of general prescription of exercise doesn't go well in term of prevention and control of Diabetes. Yogic exercises are easier to perform. This provided a hope for Diabetic patients. Further this enhances the function of pancreas and the secretion of insulin by beta cell. It could be revived through yogic exercises improved efficiency of insulin utilization and transportation of blood glucose. In such cases the benefit will be ultimately derived by Type-I and Type-II patients.

With this understanding research scholar has conceptualized this study to experiment with three variations of comprehensive yogic exercise programmes for controlling or lowering of glucose level of Type I and Type II Diabetic patients. Researcher has himself having completed professional degree in Yoga as a specialisation provided better understanding of intricacy, better programming and planning of yogic exercises and better understanding of effect of different types of yogic exercises.

Keywords: Diabetes type I & II, Asana, Pranayama, Blood Sugar

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INTRODUCTION

Lifestyle diseases are diseases that appear to become ever more widespread as countries become more industrialized. These diseases are different from other diseases because they are potentially preventable, and can be lowered with changes in diet, lifestyle, and environment. Modern scientists and researchers have absolutely changed the style in which man lives. Stress and strain are the causes of physical as well as mental distractions. Yoga has the surest remedy for man's physical as well as psychological ailments. It makes the organs of the body active in their functioning of human body.

Diabetes mellitus is the most common and possibly one of the oldest metabolic disorders in the world, ie. characterized by multi-system dysfunction due to an elevated blood sugar level. Diabetes mellitus is a metabolic disease in which the primary problem is the defective utilization of sugar by the body. Dietary sugars and starch are broken down to glucose by the process of digestion and this glucose is the major fuel for the various process, organs and cells of the body.

There are a number of long range and immediate causes for the failure of the insulin- producing Islets of Langerhans in the pancreas secreting sufficient hormones to adjust blood sugar level. Once one starts taking drug medication, these Islets of Langerhans become less efficient and may in time completely stop functioning. Chemical therapy through medication is not the answer though it supplies a type of control. The real answer to eradication of diabetes lies in eliminating the problem at the 'cause' and not by manipulating effects, or symptomatic.

In general, there are two types of diabetes. The first kind is found mainly at a young age which affects people of normal weight, and requires insulin for its management. This type of diabetes is known as Type I or insulin-dependent diabetes. The second kind of diabetes, which is by far the more common type, arises in middle or older ages, affects people who are overweight, and at least initially does not need insulin for control. This form of diabetes is known as Type II or non-insulin dependent diabetes. Factors which predispose to this kind of diabetes

include a positive family history of diabetes, overweight and sedentary habits.

Diabetes Infantalis is a congenital condition and sometimes called Juvenile Diabetes. It is one of the new scourges of mankind as diabetes is on the increase world-wide. This particular form of diabetes may not completely respond to Yoga Therapy as the cells of the body have mutated through genetic changes. These changes could be bred out for a future healthy generation by taking totally to living unified Yoga Life.

Diabetes would now have taken the place of one of the number one killers of the world had it not been for the discovery by the Canadian Sri Frederick Grant Banting (1881-1941), who discovered that the use of animal insulin controlled diabetes was one of the major causes of death in modernizing society, as well as the cause of loss of hearing, sight and internal urinary problems. These urinary problems were classified in ancient times under the term “Mutradosha,” urinary diseases, although the term “Prameha” was also used to cover a broad group of conditions affecting the kidneys, the bladder and the urinary tract. Infectious urinary disorders like gleets were also classed under either Prameha or Vahumutraroga. Metabolic disorders were certainly comprehended in Yoga Chikitsa. The various Pranas are associated with metabolic and other life processes. It was known that carbohydrate foods had to be masticated or chewed until they became liquids, mixing the digestive secretions of the mouth with the intake of food so that “shock” was not administered to the digestive system. Certain Asana, Kriyas and Mudras in the Hatha Yoga System are designed to stimulate the pancreas and the collections of special cells called Islets of Langerhans scattered throughout the pancreas. These Islets secret Insulin directly into the blood stream controlling blood/sugar balance or imbalance.

The body needs insulin, and most people have sufficient supply of it. A diabetic may have none at all, or probably not sufficient to aid in the transfer of the glucose from the blood to the respective cells. When there is no insulin, glucose builds up in the body, leading to diabetes.

Though there is no cure for diabetes, yet it can be controlled. It is not contagious. A diabetic should know everything about the disease – its nature, problems, treatment, control, self-help remedies, etc. Armed with these facts, he will be better equipped to cope with the disease every day of his life.

The body to make possible all the numerous physical and chemical activities necessary for life uses the nutrients that we consume and the oxygen that we breathe in. Metabolism involves two processes known as anabolism and catabolism. Anabolism means building up, while catabolism means breaking down.

The food that we eat is reduced by digestion into simple chemicals. These are rearranged and built into new cells, tissues, blood, bone, muscles, etc. Cells and tissues that have served their purpose, and are no longer in use, are broken down into simple chemicals. They may either be eliminated as waste from the body, or rearranged and used in some other form. During this process, energy is released. To maintain good health, there is need for a balance between the foods we eat and the metabolic requirements of the body. Starvation leads to depletion of energy and chemicals, while excess food leads to storage of fat in the body, and hence obesity.

With age the metabolic activity slows down, and a diabetic shows symptoms of starvation. While a starved person can assimilate the carbohydrates that he eats, the diabetic has them but cannot use them. The unused glucose amasses in the bloodstream and tissues, and the excess gets into the urine. The kidneys strain to eliminate the excess sugar, causing water also to be eliminated. Dehydration with insatiable thirst sets in.

When the body is starved of energy, it begins to consume itself, leading to the formation of poisonous chemicals known as ketone bodies. Gradually acidosis sets in, and, if neglected, it leads to coma, and finally death.

METHODOLOGY

For the purpose of the study a total 80 Diabetic patients were selected. The selected Diabetic patients were suffering with the Type-I and Type-II diabetics. The subjects were from wide range of age group i.e. 35-60 years. The 80 subjects selected were grouped into two as follows purposively.

Experimental Group: 60 out of which 20 were given developed yogic Asana program, another 20 with Pranayama and remaining 20 with Combination of Asana & Pranayama.

Control Group: 20

SELECTION OF VARIABLES:

1. Blood Glucose Estimation (BGE) Fasting and Post-prandial
2. Urine Sugar Estimation (USE)
3. Glucose Tolerance Test (GTT) up to 2 hours after administration of 50 gms of glucose orally.
4. Urine Sugar Estimation along with GTT.

SELECTION OF TEST & CRITERION MEASURES:

The following tests & criterion measures were selected to collect the data on selected variables.

Variables	Test	Criterion Measures
1. Blood Sugar level	God Pod method	mg / dl
2. Urine Sugar level	Benedict method	mg/ dl
3. Fasting and Postprandial	Gluco- meter	mg/ dl
4. Urine Sugar Estimation along with GTT	Benedict method	mg/ dl

ADMINISTRATION OF THE PROGRAM:

An utmost care, precaution and importance were given to administration of yogic Asana program, Pranayama program and combination of Asana and Pranayama program. The experimental yogic Asana program, Pranayama program and combination of Asana and Pranayama program were conducted within the campus of Ramakrishna Ashram, Gwalior and the tests were administered at G.R. medical college Gwalior (M.P.). Prior to conduct of training programs Pre test in all the criterion variables on which the effect of training program was to seen were tested for control and experimental groups.

Control group were exclusively administered the centre's program while experimental group was exposed to Asana program, Pranayama program and combination of Asana and Pranayama program in addition to regular medication program. The experimental rehabilitation program was conducted for twelve weeks.

A training protocol for Periodic load assessment and evaluation, subjective intensity evaluation by observing facial expression and breathing frequency was ascertained for every subject. While administering the program care was taken to see that every subjects perform the work load comfortably during initial 10 days. After every 10 days load parameters were increased progressively by 5-10%. Asana program, Pranayama program and combination of Asana and Pranayama program was conducted 6 days a week schedule.

Weekly Schedule for Different Experimental Groups

Days/week	Experimental group-I (Asana Group) 6:00- 6.45 am	Experimental group-II (Pranayama Group) 6:00- 6.45 am	Experimental group-III (Combination Group) 6:50- 7.35 am
Monday to Saturday/1st to 3rd week	Prayer - 5 min. Suryanamaskara – 5 rounds. Savasana – 2 min. Treatment – 15 min	Prayer - 5 min. Kapalbhati- 5 rounds Savasana – 2 min. Treatment – 15 min	Prayer - 5 min. Suryanamaskara – 2 rounds. Kapalbhati- 3 rounds Savasana – 2 min. Treatment – 15 min
Monday to Saturday/4th to 6th week	Prayer - 5 min. Suryanamaskara – 5 rounds. Savasana – 2 min. Treatment – 20 min.	Prayer - 5 min. Suryanamaskara – 5 rounds. Savasana – 2 min. Treatment – 20 min.	Prayer - 5 min. Suryanamaskara – 2 rounds. Kapalbhati- 3 rounds. Savasana – 2 min. Treatment – 20 min.
Monday to Saturday/7th to 9th week	Prayer - 5 min. Suryanamaskara – 5 rounds. Savasana – 2 min. Treatment – 25 min.	Prayer - 5 min. Suryanamaskara – 5 rounds. Savasana – 2 min. Treatment – 25 min.	Prayer - 5 min. Suryanamaskara – 2 rounds. Kapalbhati- 3 rounds. Savasana – 2 min. Treatment – 25 min
Monday to Saturday/10th to 12th week	Prayer - 5 min. Suryanamaskara - 5 rounds. Savasana – 2 min. reatment – 30 min.	Prayer - 5 min. Suryanamaskara - 5 rounds. Savasana – 2 min. Treatment – 30 min.	Prayer - 5 min. Suryanamaskara – 2 rounds. Kapalbhati- 3 rounds. Savasana – 2 min. Treatment – 30 min
Sun.	Rest	Rest	Rest

Load intensity and volumes were kept widely flexible so that it remains within the range of every subject's accomplishment. And at the end of every ten days load effect and recovery pattern for all the subjects were evaluated and based on that five to ten percent increase in intensity was made. Each Asanas were performed for 2 to 3 repetitions with duration of 30 to 45 sec. after each set of practices relxative practices were performed.

The Analysis of Covariance was applied to see the effect of Asanas, Pranayama and combination of Asana and Pranayama on Blood Sugar and Urine Sugar levels of Diabetes Type-I and Type-II patients.

RESULTS AND FINDINGS

Analysis of covariance was used exclusively to compare the effect of three yogic experimental treatments programme for Type-I and Type-II Diabetic patients .Findings shows significant effect of all three experimental group in both the categories of Diabetes. The significant effect as lowering of sugar was found both in blood test and urine test. The significance of all the three programme were observed on both six weeks testing as well as twelve weeks testing. At end of twelve weeks the equated mean blood sugar value for Type- I Diabetes was found to be 214.91 mg, 217.8 mg, 211.31 mg, and 235.01 mg respectively for the asanas group,

pranayama group and combination of asanas and pranayama and control group.

The experimental groups were further found significant on lowered Blood Sugar level with a mean difference value, when compared to control group as 20.1 mg, 17.21 mg and 22.7 mg for Asana group, Pranayama group and combined group respectively.

In urine test among the Type-I Diabetic patients the post equated mean value that were observed 239.10 mg, 241.1 mg, 234.4 mg and 246.5 mg for asana group, pranayama group, combined group and control group respectively. All the three form of experimental yogic treatment were significant and showed lowering of urine sugar level as 7.4 mg, 5.4 mg and 12.1 mg for asana group, pranayama group and combined group respectively. This reduction in Urine Sugar observed in terms of comparing with Urine Sugar level of control group.

Among Type-II Diabetic patients also, three forms of yogic practice were significantly effective. Statistical finding shows that post mean values 249.43 mg, 251.73 mg, 247.93 mg and 261.73 mg for Asana group, Pranayama group ,combined group and control group respectively. All the three experimental group with average lowering of Blood Sugar 12.5 mg, 10 mg and 13.8 mg for asana group, pranayama group and combined group respectively.

In urine sugar level assessments also three forms of the yogic experimental treatment were highly significant. The post equated mean value; analysis of covariance was observed 254.3 mg, 249.0 mg, 246.0 mg 255.4 mg for asana group, pranayama group, combined group and control group respectively.

Further the three experimental groups were highly effective in lowering of sugar level with an average value of 5.3 mg 6.4 mg, and 9.4 mg for asana group, pranayama group, and combined group respectively. This value was obtained by statistically comparing with the value of control group. In the Urine Sugar level from statistical finding it was concluded that three forms of yogic experimental treatment i.e. asana programme, pranayama programme & combined programme were highly effective in lowering blood sugar levels of Type-I as well as Type- II Diabetic patients. The three programmes were effective in lowering the blood sugar in blood as well as urine for type-I and type-II Diabetic patients.

MEAN COMPARISON OF BLOOD SUGAR LEVEL FOR DIABETIC TYPE -I PATIENT OF THREE EXPERIMENTAL GROUPSAND CONTRO L GROUP AFTER SIX WEEKS OF EXPERIMENTAL TREATMENT

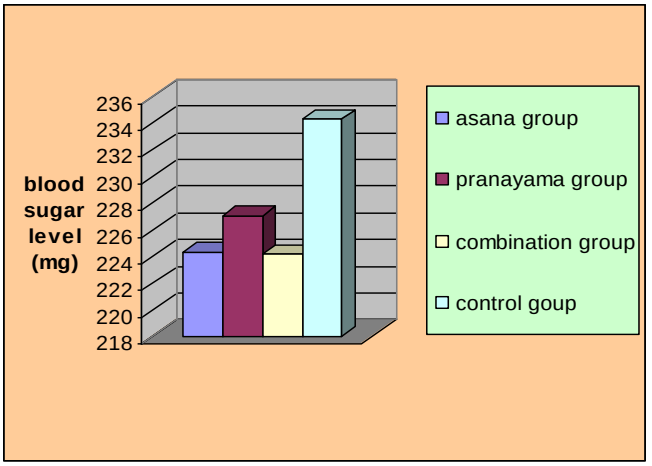

Figure 1

MEAN COMPARISON OF BLOOD SUGAR LEVEL FOR DIABETIC TYPE -I PATIENTS OF THREE EXPERIMENTAL GROUPS AND CONTROL GROUP AFTER TWELVE WEEKS OF EXPERIMENTAL TREATMENT

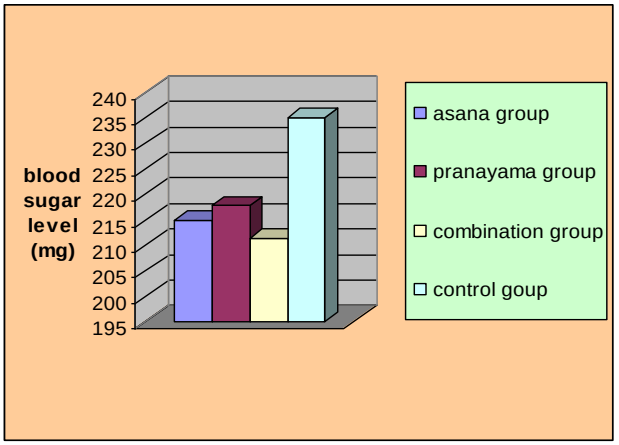

Figure 2

MEAN COMPARISON OF BLOOD SUGAR LEVEL FOR DIABETIC TYPE -II PATIENTS OF THREE EXPERIMENTAL GROUPS AND CONTROL GROUP AFTER SIX WEEKS OF EXPERIMENTAL TREATMENT

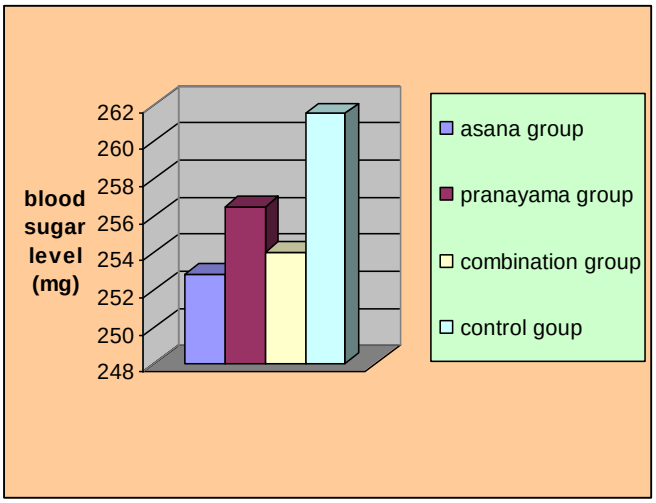

Figure 3

MEAN COMPARISON OF BLOOD SUGAR LEVEL FOR DIABETIC TYPE -II PATIENTS OF THREE EXPERIMENTAL GROUPS AND CONTROL GROUP AFTER TWELVE WEEKS OF EXPERIMENTAL TREATMENT

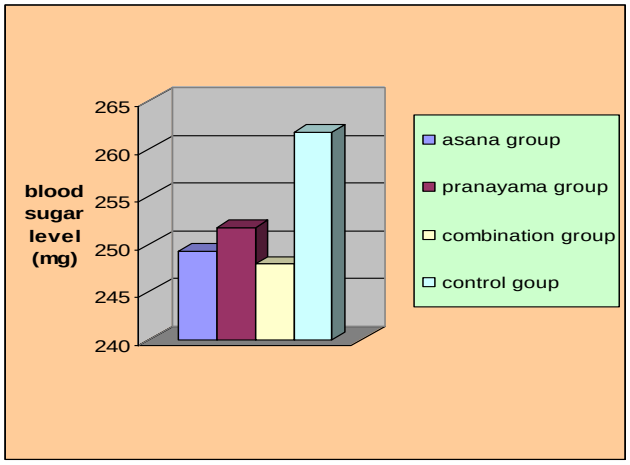

Figure 4

CONCLUSION

Successful accomplishment of this study was a result of very exhaustive deliberation, discussion critical reviews of literature frequent and several experimentation and finally compliance of various systematic methodologies in administrating of yogic treatment of programmes. Finding of the study not only provided understanding about the yogic experimental effects but also methodology of conduct of such studies. Based on all above finding from statistical analysis, scholar's own inferential ability and within the constraints and limitations of the study following conclusions were drawn.

1. Yogic Asana and Pranayama (Combination) based comprehensive exercise programme can significantly reduce the Blood Sugar level among Type-I and Type-II Diabetic patients.

2. Yogic Asana and Pranayama (Combination) based comprehensive exercise programme is also effective in lowering Urine Sugar level of Type-I and Type-II Diabetic patients.

3. Asana based therapeutic programme for Diabetic patients provide a good alternative exercise programme, who cannot afforded to participate in regular programme of other exercise.

4. Yoga based therapeutic programme are more comprehensive and suitable for any age group Diabetic patients.

5. Unlike other exercise programme which are generally prescribed and found effective only for Type-II Diabetic patient, yogic exercise based therapeutic programme is in hand and is effective for Type-I Diabetic patient also.

6. Unlike other exercise programme yogic exercises emplace on functional improvement of organ and improvement of efficiency of various functioning systems of the body.

7. Yogic based therapeutic programme for Diabetic patients is highly effective from the point of direct functional improvement revival of pancreatic actions insulin functional efficiency etc.

8. While programming yogic exercise based programme for Diabetic patients, it is most necessary to understand and incorporate yogic Asanas and Pranayama which essentially involve movements stretching, pressure, stimulation etc effectively on abdominal organs area.

ACKNOWLEDGEMENT

Researcher feels highly privileged and expressed a deep sense of thankfulness for all the interest shown, suggestions and encouragement offered by Mr. Kulvinder Singh Bagga, Asst. Prof KRTT College, Mathura (U.P.), Mr. Pradeep Chahar and Mr.

Ashutosh Acharya research scholars LNIPE Gwalior (M.P.) and Mr. Gyanendra, Lab Technician G.R. Medical College, Gwalior (M.P.)

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