THE YOGIC INSIGHT

ISSN No.: 2582-9076
Vol.: 3
Pp: 168-181

YOGIC INTERVENTION MODULE IN THE MANAGEMENT OF POST- CORONAVIRUS DISEASE- 2019 WITH SPECIAL REFERENCE OF TYPE 2 DIABETES MELLITUS PATIENTS

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ABSTRACT

INTRODUCTION: The sudden outbreak pandemic of 2019 novel coronavirus in Wuhan, China, which rapidly grew into a globally, marked the third introduction of a virulent coronavirus into the human society, which was not affecting only the health- heal system, but also the entire global economy. Although our understanding of coronaviruses has undergone a huge leap and the effective approaches to prevention, treatment and epidemiological control are still lacking.

PURPOSE: This study aimed to investigate the effects of 12 weeks yogic intervention on Post- coronavirus disease patients (PCDP) with Type 2 diabetes mellitus (T2DM).

SUBJECTS AND METHODS: 160 subject (age range 27–51 years) T2DM were divided into two groups, namely, yogic intervention group (YIG: n = 70, age 39.70 ± 6.83) and control group (CG: n = 70, age 40.18 ± 7.89). YIG underwent yoga practice (Shatkriya-s, Yogāsana-s, Pranayama-s) for 12 weeks (5 sessions/week), while the CG continued their usual routine activities. The basal parameters included in the biochemical investigations are FBG, PPBG, HbA1C, Standing height and body weight were measured before commencement and after 6 and 12 weeks of yogic intervention in both groups.

RESULTS AND ANALYSIS: Data related to biochemical tests were analyzed by using SPSS programme version of 20.0 software facilities in the computer. There was a significant ($P < 0.01$) decrease in fasting plasma glucose, postprandial blood sugar.

CONCLUSION: It can be said that Yogic intervention may have the beneficial effects with T2DM. Therefore, Yogāsana and Pranayama may be used as an adjunct to medical therapy to optimize the biochemical parameters. Yoga therapy also improves the status of diabetics in terms of reduction of drug doses, physical and mental alertness and prevention of complications.

KEYWORDS: Yoga, COVID-19, Type-2 Diabetes Mellitus

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INTRODUCTION

The most serious pandemic disease of the decade, i.e., COVID-19, is a severe acute upper respiratory entity that is caused by common cold receptors. Considering its highly spreading nature, high prevalence rate, that's why; it is declared a global health emergency. The number of cases worldwide shows that people of all ages can get affected by Virus. However, as per WHO guidelines, People with low immunity or above 60 years, People with co-existing chronic disease or previously diagnosed respiratory (chronic lung disorder, bronchial asthma, etc.), cardiovascular, endocrine or inflammatory diseases, morbid obesity, diabetes mellitus, renal or liver disorders are more prone for a severe and critical exhibition of coronavirus with the high mortality rate (Zhang et al.2020).

Diabetes is considered one of lifestyle disorder and the leading epidemic in the world with 72.9 million cases in India (Data noted from International Diabetes Federation, 2017). It is the disease in which there is an inappropriate escalation in glycemic parameters in the body along with dys-regulated insulin secretion. In the pre-diabetic condition, the blood glucose gradually started to increase and on the passing time it is convert to diabetic stage. In other words, pre-diabetes (FBG- 100-125mg/dl, HbA1c-5.7-6.4%) (ADA, 2010) is an intermediary state between high blood glucose level and normal blood glucose level. Diabetes is a metabolic disorder, which is associated with various types of micro and macro vascular complications (Chawla et al., 2016). The pre-diabetic stage is considered an alarming stage where one should take the proper preventive measures for handling the conversion from pre-diabetes to Diabetes stage.

Diabetes mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia due to relative insulin deficiency or resistance or both. The successful management of diabetes revolves around an individually tailored nutritional diet plan, exercises regimen, use of oral hypoglycemic agents and / or insulin. Regular reading monitoring by patient and physician, and supportive education are an integral and important part of management the disease up to certain level. In developing countries, low-cost strategies to identify at risk individuals and the implementation of inexpensive lifestyle interventions management module like Yogic practices are the best options which help the people to overcome and maintain their health. In view of people embracing sedentary life style, and the effectiveness of treatment becoming less, the role of regular exercise especially 'Yoga and it practices' seems to be a beneficial and economical adjuvant

in the management of the Type 2 DM (T2DM). Yogic practice is a slow, static type of muscular exercise which help to create a maximum elastic and also develop the proper coordination in all the system of human body. It can also be helpful to those who having a limited joint mobility, physical unfitness associated with overweight and sedentary lifestyle that would otherwise be unwilling to participate in conventional type physical activities like gym-based training, vigorous strength exercises and heavy intensive training. Therefore, Yogic practices seem to be the earliest and the most effective method for providing peace and maintenance of the tranquility of mind. Most of the recent review suggested Physiology Section that Yogic Practices are very helpful to reduce the stress, improve metabolic profile, regulate autonomic nervous system and alter hypo-thalamo-pituitory adrenal axis which act as neural mediators of hyperglycemia. However, there are few reports and studies as regards to the influence of Yoga on blood glucose level. Hence, the present study was undertaken to assess the beneficial effects of Yoga module on blood glucose levels in Post-coronavirus patients with T2DM complications.

The science of Yoga is an ancient discipline which helps the people to maintain their lifestyle and prevent many other health hazards. Yoga is a practical spiritual discipline incorporating a wide variety of practices whose goal is development and establish a proper coordination in the state of mental and physical health, wellbeing and ultimately achieving a state of union in the human individual with the universal and transcendental existence. On the physical and gross level Yogāsana which is any posture that create a steady and comfortable zone that are designed to tone, strengthen and align the body. On the mental and psychological level Yogic practices uses breathing technique Pranāyamā and Dhyanā which create a equity, purify and discipline the mind. Many authentic researches of last centuries claimed that Yogic Practices the muscles absorb the excess glucose in the blood, thereby reducing the blood sugar level. They help the pancreas and liver to function effectively, which regulates the blood sugar levels. Yogāsana is also help in rejuvenating the pancreatic cells, thereby assisting insulin secretion. The proper and uniformity muscular movements also help in bringing down the blood sugar levels by increasing the glucose utilization.

In light of the above, identifying that the sustainable interventions module create a proper lifestyle management with the potential to improve multiple factors of relevance to manage the complex illness is of clear importance. Mind-body practices such as Yoga, which capitalizes on the ability of the psychological to

enhance physiological health (and vice versa) appear particularly suited for addressing multi-factorial conditions. Yoga is an ancient authentic mind-body system originating in India over thousands of centuries ago. In recent few decades, the practice of Yogāsana and Pranāyamā has been rising in both developed and developing countries worldwide, and the field of Yoga therapy is also start growing more and more rapidly.

A growing body of evidence suggests Yogic practices may reduce risk for many lifestyle disorders and lead to improvements in physical health and well-being over a range of populations worldwide, potentially including those with DM2. In this systematic review, we critically evaluate available evidence from controlled trials regarding the effects of Yogic practices-based programs on health-related outcomes in adults with DM2. On the available and current Literature, the researchers is also outline major limitations, briefly discuss possible mechanisms that may underlie observed benefits, and suggest directions for future research.

MATERIAL AND METHOD

The study of the assessment of biochemical parameters before and after 12 weeks of Yogic practices by Type 2 Diabetes Mellitus patients was conducted in the New Era(Advance blood testing Centre) bio-chemistry labs for medical examining the reading in Chandigarh.

The Yoga department expert-s ethical committee had approved the study protocol and design.

SELECTION OF SUBJECTS

One hundred twenty of Type 2 Diabetes Mellitus (NIDDM), with a history of diabetes for 0-10 years, in the age group of 26 – 54 years, were selected. The diagnosis of Type 2 Diabetes Mellitus (NIDDM) patients were done according to the WHO criteria.

The scope and objectives of the present study was explained to all the subjects. A written, duly signed consent was taken from the subjects according to the ethical principles of the Indian Council of Medical Research, New Delhi, India.

METHODOLOGY:

The patients were divided into two separate groups.

Group I (n1 = 60, Male=36, Female=24) Type 2 Diabetes Mellitus patients belonged to the Yoga intervention group were put through various Yogic practices

for 12 weeks, together with diet plus diabetic medicines. All these patients performed Yogāsana and Pranāyamā for approximately 45 minutes, for 12 weeks (5 days in week) under the supervision and guidance of a Yoga expert. All the patients do not hesitate to do Om chanting.

Group II (n2= 60, Male=35, Female=25) Type 2 Diabetes Mellitus patients or the control group patients, were retained on diet plus normal medical therapy only. The controls were matched with respect to age, sex, BMI, duration of diabetes and glycemic base line parameters.

YOGA GROUP

60 number of subjects with Type 2 Diabetes Mellitus subjects in the Yoga group (n1) were kept on a prescribed diet and oral anti-diabetic medicines as prescribed by their clinician and they performed specific Yogāsana and Pranāyamā for 12 weeks/ 45 minutes under the guidance of a Yoga expert. The important parameters before the commencement of the Yogic Practices (baseline values) and after the Yoga therapy were recorded. The observations and results are enumerated in the succeeding paragraphs.

YOGA PROTOCOL

All the subjects with in the Yoga intervention group were taught Yogāsana, Pranāyamā and Meditation Practices. The duration of practice was for 45 minutes from 7:15 AM to 8: 00 A.M. It was advised to keep bowel and bladder emptied prior to Yogic practice-s. The duration of Yogāsana was 26 minutes approximately and that of Pranāyamā was 14 minutes approximately. The practitioner was to perform shavasana in between Yogāsana and Pranāyamā to normalize the breathing. Taking mental awareness particularly the parts of the body being activated in a Yogāsana is very important. This relaxes the mind during the Yoga protocol session. While care was taken regarding individual body make up and limitations they were advised not to strain too much in order to attain the correct posture. The body gets gradually tuned, with smooth regular practice.

CONTROL GROUP

In the control group, 60 number of Type 2 Diabetes Mellitus subjects were on diet and medical therapy, as prescribed by the clinician. The biochemical parameters of the control group were taken as baseline and again evaluated after 12 weeks. The observations are results which are enumerated in the succeeding paragraphs.

BIOCHEMICAL PARAMETERS

The Basal parameters included in the biochemical investigations are

- ❖ Fasting Blood glucose (FBG),
- ❖ Post Prandial Blood Glucose (PPBG),
- ❖ Glycosylated Hemoglobin (HbA1C).

Fasting Blood glucose (FBG), Post Prandial Blood Glucose (PPBG) were analyzed by autoanalyser COBAS 400 PLUS.

Glycosylated Hemoglobin (HbA1C) was analyzed by indirect ELISA method.

STATISTICAL METHOD

Data related to biochemical tests were analyzed by using SPSS programme version of 20.0 software facilities in the computer. The data were expressed as Mean±S.D.

Student's paired t-test was done to compare the changes in biochemical parameters at the beginning and end of the study in case and control group respectively.

Then, a comparison between the changes of respective parameter in both group (case and control) was done by Independent t-test, P-value.

OBSERVATION

GENDER	YOGA GROUP	CONTROL	PERCENT
MALE	**36**	**35**	**59.16%**
FEMALE	**24**	**25**	**40.83%**

Table 1: SEX DISTRIBUTION OF THE SAMPLE

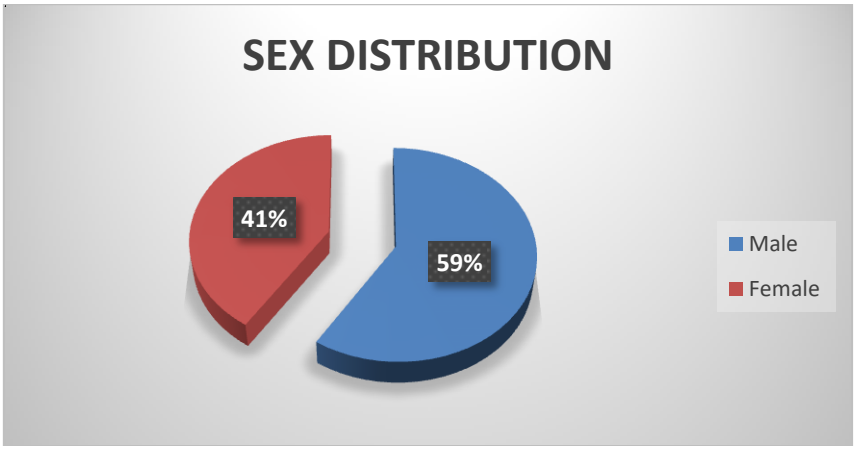

FIGURE 1. SEX DISTRIBUTION OF THE SAMPLE

The study population included 71 male (59.16%) and 49 female (40.83%). The Yoga intervention group contains 36 male and 24 female. Similarly, in the control group contains 35 male and 25 female.

AGE DISTRIBUTION	YOGA GROUP	CONTROL	PERCENT
25 - 40 YR	**31**	**38**	**57.50%**
41 – 55 YR	**29**	**22**	**42.50%**

TABLE 2: AGE DISTRIBUTION OF THE SAMPLE

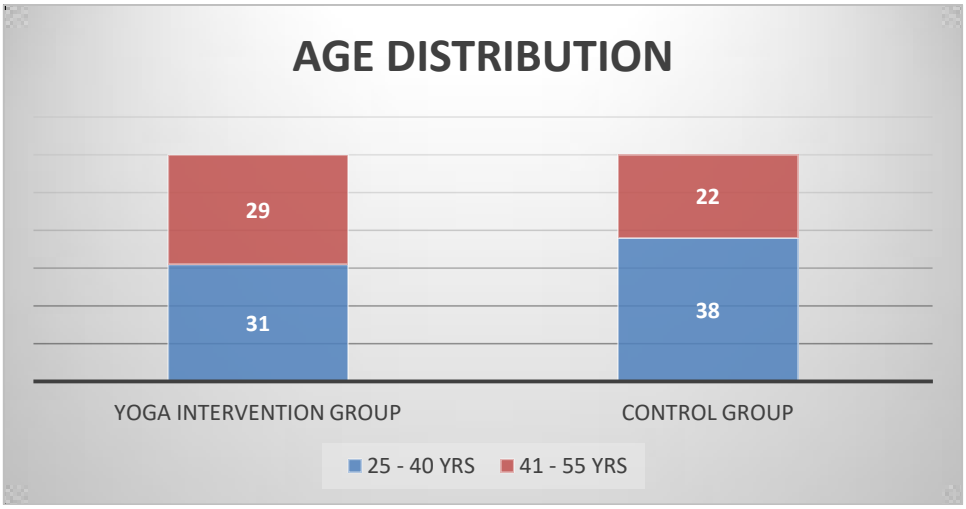

FIGURE 2. AGE DISTRIBUTION OF THE SAMPLE

Most of the diabetic population included in the research belonged to 25 - 40 year age group (57.50%). The Yoga Intervention group contains 31 subjects within the 25 - 40 year age group. Similarly, the control group contains 38 subjects within this age group.

BMI	18.9-20.9	21-22.9	23-24.9
YOGA GROUP	**46.64%**	**21.55%**	**31.80%**
CONTROL	**53.36%**	**24.88%**	**21.76%**

TABLE 3: BMI OF THE STUDY SAMPLE

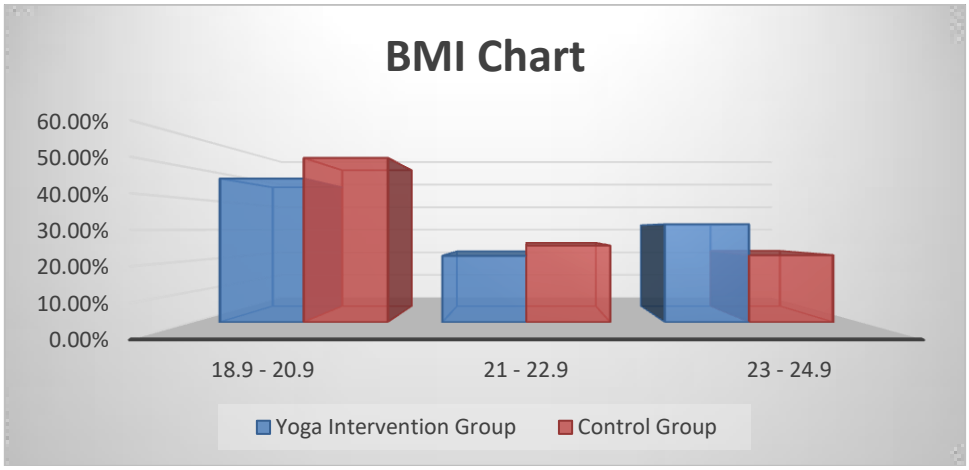

FIGURE 3:- BMI OF THE STUDY SAMPLE

Table- 3 represents the BMI of the sample. BMI was calculated from formula,

BMI=WEIGHT IN Kg/ HEIGHT IN m2

Persons having BMI < 25 were included in the study sample (YOGA GROUP & CONTROL GROUP) to exclude BMI as confounding factor.

S.NO	PARAMETERS	BEFORE YOGA MEAN±S.D.	AFTER YOGA MEAN±S.D	P VALUE
1	**FBG**	**171.53±61.92**	**113.20±29.24**	**<0.05**
2	**PPBG**	**250.73±63.72**	**152.90±54.59**	**<0.05**
FBG	Fasting Blood Glucose In mg/dl			
PPBG	Postprandial Blood Glucose In mg/dl			

TABLE 4: EFFECT OF YOGA INTERVENTION MODULE ON BLOOD GLUCOSE LEVELS IN TYPE 2 DIABETIC POST COVID-19 PATIENTS. (N1 = 60)

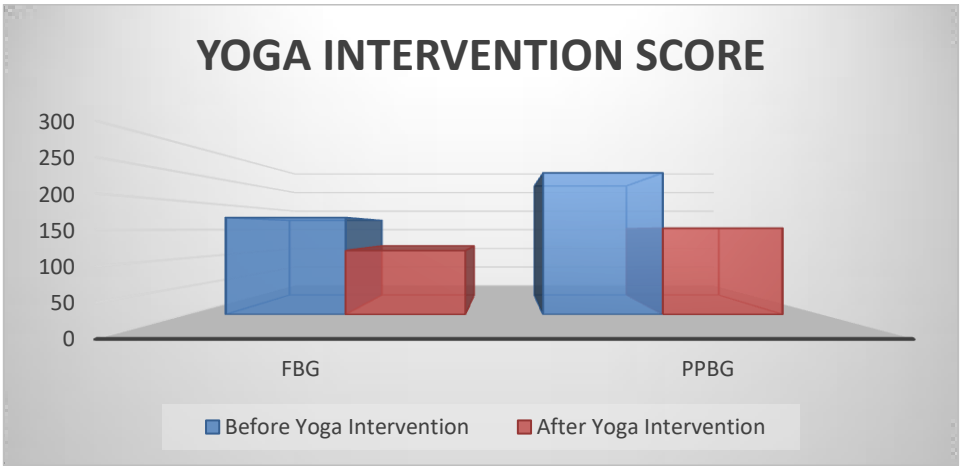

FIGURE 4: EFFECT OF YOGA INTERVENTION GROUP ON BLOOD GLUCOSE (MG/DL) LEVELS IN TYPE 2 DIABETES

There was a decrease in the fasting blood glucose (FBG) from 171.53±61.92 mg/dl to 113.20±29.24 mg/dl, which was significant at a p value of 0.05. Postprandial Blood Glucose (PPBG) after two hour of food intake also decreased from 250.73±63.72 mg/dl to 152.90±54.59 mg/dl at a p value of 0.05.

S.NO	Parameters	Initial Mean±S.D	After 12 Weeks Mean±S.D	P Value
1	**FBG**	181.63±42.67	176.07±33.09	**<0.05**
2	**PPBG**	260.51±40.29	243.63±39.62	**<0.05**
FBG	Fasting Blood Glucose In mg/dl			
PPBG	Postprandial Blood Glucose In mg/dl			

TABLE 5: CHANGES IN BLOOD GLUCOSE BEFORE AND AFTER 12 WEEKS IN CONTROL GROUP TYPE 2 DIABETIC POST COVID-19 PATIENTS. (n2 = 60)

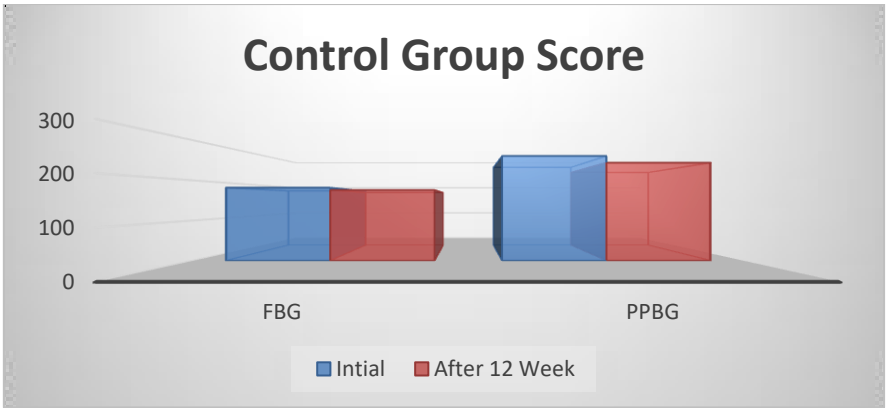

FIGURE 5. CHANGES IN BLOOD GLUCOSE (MG/DL) BEFORE AND AFTER 12 WEEKS IN CONTROL GROUP TYPE 2 DIABETES

There was a decrease in the fasting blood glucose (FBG) from 181.63±42.67 mg/dl to 176.07±33.09 mg/dl, which was significant at a p value of 0.05. Postprandial Blood Glucose (PPG) after two hour also decreased from 260.51±40.29 mg/dl to 243.63±39.62 mg/dl at a p value of 0.05.

S.NO	Parameters	YOGA GROUP (n1 = 60)	CONTROL GROUP (n2 = 60)	P Value
1	**DIFF. FBG**	58.33±32.68	5.56±9.58	**<0.05**
2	**DIFF. PPBG**	97.83±9.13	16.88±0.67	**<0.05**
DIFF FBG:- Changes In Mean Fasting Blood Glucose At Beginning Of Study And After 12 Weeks i.e. End Of The Study in mg/dl				
DIFF PPBG:- Changes In Mean Postprandial Blood Glucose At Beginning Of Study And After 12 Weeks i.e. End Of The Study in mg/dl				
TABLE 6:COMPAIRISION BETWEEN CHANGES OF BLOOD GLUCOSE LEVELS IN YOGA INTERVENTIONAL GROUP AND CONTROL GROUP				

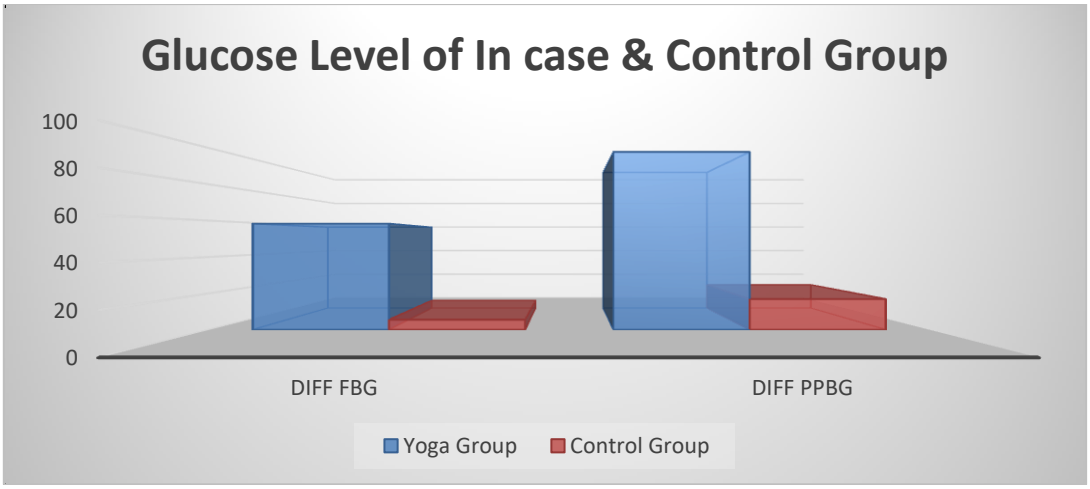

FIGURE 6. COMPARISON BETWEEN CHANGES OF BLOOD GLUCOSE LEVELS IN YOGA GROUP AND CONTROL GROUP

Levene's Test for Equality of Variances had been done to compare the changes in parameters in between Yoga Intervention group and control group. There was significant reduction in Mean Fasting Blood Glucose and Mean

Postprandial Blood Glucose in case group in comparison to control group with a p-value <0.05.

S.NO	Parameters	Before Yoga Mean±S.D	After Yoga Mean±S.D	P Value
1	HbA1C	8.09±0.68	7.68±0.51	**<0.05**
HbA1C: Glycosylated Hemoglobin in percentage				

TABLE 7: EFFECT OF YOGA INTERVENTION MODULE ON GLYCOSYLATED HAEMOGLOBIN IN TYPE 2 DIABETICS (n=60)

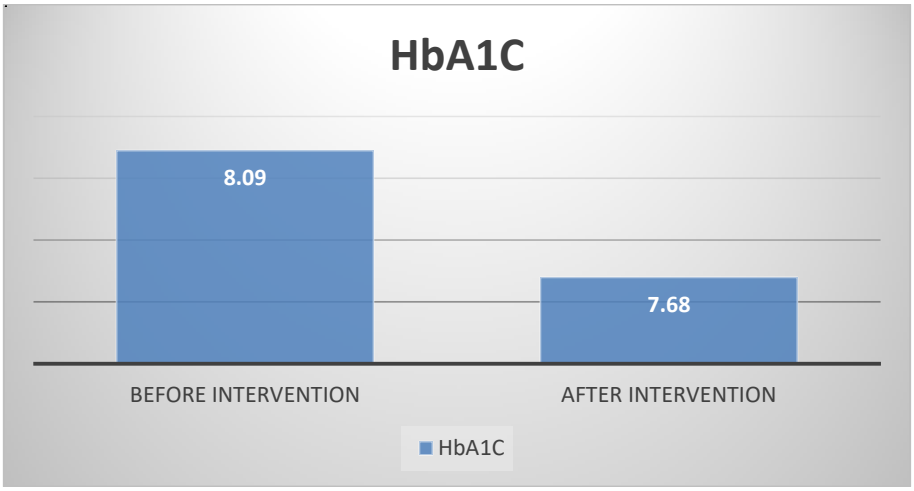

FIGURE 7. EFFECT OF YOGA INTERVENTION GROUP ON GLYCOSYLATED HAEMOGLOBIN (%) IN TYPE 2 DIABETICS

There was a decrease of glycosylated hemoglobin from 8.09±0.68 to 7.68±0.51, was significant at a p value of 0.05.

S.NO	Parameters	Initial Mean±S.D	After 12 weeks Mean±S.D	P Value
1	HbA1C	7.97±0.72	7.82±0.71	**0.601**
HbA1C: Glycosylated Hemoglobin in percentage				

TABLE 8: CHANGES IN GLYCOSYLATED HAEMOGLOBIN BEFORE AND AFTER 12 WEEKS IN CONTROL GROUP TYPE 2 DIABETICS (n=60)

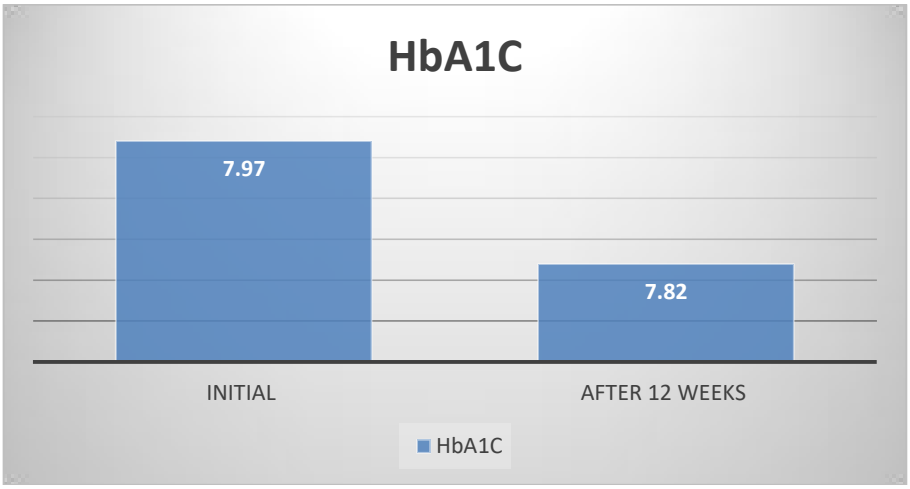

FIG.8. CHANGES IN GLYCOSYLATED HAEMOGLOBIN (%) BEFORE AND AFTER 12 WEEKS IN CONTROL GROUP TYPE 2 DIABETICS

There was a decrease of glycosylated hemoglobin from 7.97±0.72 to 7.82±0.71, was significant at a p value of **0.601**.

DISCUSSION

The present Study Is "Yogic Intervention Module in the Management of Post-Coronavirus Disease- 2019 with Special Reference of Type 2 Diabetes Mellitus Patients." The study was conducted in the post-coronavirus patients in Chandigarh, Panchkula and mohali. The basal parameters included in the biochemical investigations are Fasting Blood glucose (FBG), Post Prandial Blood Glucose (PPBG), Glycosylated Hemoglobin (HbA1C). From the statistical analysis of the results obtained in the present study and their comparison, it may be concluded that Yogic practices helps in decreasing blood sugar level and keep the diabetes in control.

The observations suggest that the performance of Yogāsanas led to increased sensitivity of the B cells of pancreas to the glucose signal. The increased sensitivity seems to be sustained for long time resulting in a progressive long term effect of Yogic practices. The study is significant because, it has for the first time attempted to probe the mechanism by which Yogāsanas and Pranāyamā reduce blood sugar. In the present study there was a significant fall in the fasting blood glucose levels in the Yoga Intervention group of Post-Coronavirus – 19 Patients.

In the present study, there was a decrease in glycosylated hemoglobin in the NIDDM of Post-Coronavirus patients undergoing Yogic practice. The exact cause of reduction in HbA1c is not known. But the reduction in glycosylated Hb protects the post-coronavirus -19 patients from early development of various microvascular and macrovascular complications of diabetes mellitus.

By modifying the state of anxiety, Yogic practices reduces the stress induced sympathetic activity on body which helps to maintain a better balance between the sympathetic and parasympathetic nervous system. Thus, a decrease in sympathetic discharge and better ability is to overcome stress and other metabolic functions that regulate the glucose level in human body. Many current researches claimed that Meditation is also influence metabolic activity by reducing adreno-cortical activity, long term decreased secretion of cortisol and decreased thyroid stimulating horomones. All the patients in the Yoga intervention group develop a sense of wellbeing without any side effect. So they are self-motivated to continue

the Yogic practice as a daily routine in their life. Practice of Yogāsanas and Pranāyamā may be helpful in reducing body weight in obese person as a result of which remote complications of diabetes mellitus may be prevented.

It can be concluded that Yogāsanas and Pranāyama may be used as an adjunct to medical therapy to optimize the biochemical parameters on body. Yogic Practices also improves the status of diabetics in terms of reduction of drug doses, Physical and mental alertness and prevention of complications. So, Yogic practice has a role in both primary and secondary prevention in diabetes mellitus in Post Coronavirus-19 scenario. Therefore, Yoga Module may be considered as a beneficial adjuvant for management of type 2 diabetes mellitus.

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