

EFFECT OF YOGA IN PATIENT'S WITH TYPE-II DIABETES MELLITUSSatarupa Dash¹, Atanu Kumar Thakur²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Diabetes Mellitus is one of the most common chronic non-communicable diseases in the world. Type 2 DM is a heterogeneous disorder characterized by a genetic predisposition and interaction between insulin resistance and pancreatic beta cell dysfunction. In addition to increased glucose level metabolic disorder of plasma lipid also occur in NIDDM patients. Yoga is an ancient Indian science. Nowadays yoga has been applied in the field of therapeutics in various diseases like hypertension, diabetes, asthma. In this case study had been conducted to understand effect of yoga in type 2 diabetics. The study is conducted on outdoor patient basis at Dept. of physiology V.S.S Medical College Burla with the help of department of Medicine and yoga center sambalpur. Sixty patients with Type 2 Diabetes Mellitus (NIDDM) were divided into two separate groups. Group I (n1 = 30) patients belonged to the Yoga group were put through various Yogic asana for 40 days, together with diet plus diabetic medicines. Group II (n2 = 30) patients or the control group patients, were retained on diet plus normal medical therapy. The basal parameters included in the biochemical investigations are FBG, PPBG, HbA_{1c} and lipid profile. Data related to biochemical tests were analyzed by using SPSS programme version of 16.0 software facilities in the computer. From the statistical analysis of the results obtained in the present study and their comparison with other published reports, it may be concluded that yoga helps in decreasing blood sugar level and keep the diabetes in control. So also the reduction in HbA_{1c} protects the patients from early development of various microvascular and macrovascular complications of diabetes mellitus. The change in lipid profile status prevents the early development of comorbid condition like hypertension, coronary artery disease. It can be concluded that yoga asana 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.

INTRODUCTION: Diabetes mellitus is a heterogeneous group of disease, characterized by a state of chronic hyperglycemia, resulting from a diversity of etiologies, genetic and environmental factors acting jointly.¹

The underlying cause of diabetes is the impaired production or action of insulin, a hormone that controls glucose, fat and amino acids metabolism.

The metabolic dysregulations associated with diabetes mellitus (DM) causes secondary pathophysiological changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on health care system.²

Two broad categories of diabetes are designated as type 1 and type 2 diabetes mellitus (DM). Type 1 diabetes is the result of complete or near total insulin deficiency. Type 2 diabetes mellitus is a heterogeneous group of disorder characterized by variable degree of insulin resistance, impaired insulin secretion and increased glucose production and abnormal fat metabolism³. Type 2 DM is more common than type 1 DM.

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According to World Health Organization (WHO) at least 366 million people worldwide have diabetes in 2011. This figure will rise to 552 million by 2030. The number of people with type 2 DM is increasing in every country⁴.

WHO predicts that developing countries will bear the burden of this epidemic in the 21st century. Eighty percent of all new cases of diabetes are expected to occur in the developing countries by 2020.

India is called the diabetic capital of the world. Type 2 diabetes mellitus in Indians is being increasingly seen in younger and less obese persons than in western countries.

Industrialization and improved facilities in our country in the past three decades have changed our lifestyle. There are decreased physical activities, excess food intake with fat dense calories and stress of working. All these factors contribute to increase prevalence of diabetes in our country. Increased longevity also contributes to the increased diabetic prevalence.

So the earlier onset, coupled with delayed diagnosis and improper care may lead to high complication rate, greater loss of productivity and consequently higher financial burden in Indian economy.

About 30% of type 2 diabetes is preventable by changing diet, increasing physical activities and improving the living environment. Yet without effective prevention and control programmes the incidence is likely to continuously rising globally.

Now-a-days more stress is given on preventing type 2 diabetes mellitus and its complication by proper diet, exercise and mental relaxation.

The science of yoga is an ancient one. Yoga is a practical discipline incorporating a wide variety of practices whose goal is development of a state of mental and physical health, wellbeing and ultimately 'a union of the human individual with the universal and transcendental existence'.⁶

On the physical level yoga asana (any posture which is steady and comfortable) are designed to tone, strengthen and align the body. These postures are performed to make the spine supple and healthy and to promote blood flow to all the organs, glands and tissue keeping all bodily systems healthy.

On the mental level yoga uses breathing technique Pranayama (control of prana, i.e. source of energy) and Meditation (dhyana) to quiet, purify and discipline the mind. So yoga is not a religion but a way of living with sound health and peace of mind.

By yogic exercises 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. Asanas help in rejuvenating the pancreatic cells, thereby assisting insulin secretion. The muscular movements also help in bringing down the blood sugar levels by increasing the glucose utilization. Asanas induce relaxation, which also plays a key role in the healthy functioning of the internal organs of the body.

There is less number of studies on the population of western Odisha to assess the effect of yoga on type 2 diabetes mellitus.

So the aim of this study is to find out the effect of yogic asana and pranayama on various biochemical parameters of type 2 diabetes mellitus patients over a period of 40 days in the western Odisha.

MATERIAL AND METHOD: The study of the assessment of biochemical parameters before and after 40 days of Yogic exercises by Type 2 Diabetes Mellitus patients was conducted in the Departments of

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Physiology V.S.S Medical College Burla with the help of Department of Medicine . The institutional ethical committee had approved the study protocol and design.

SELECTION OF SUBJECTS: Sixty patients of Type 2 Diabetes Mellitus (NIDDM), with a history of diabetes for 0-10 years, in the age group of 40 – 60 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 = 30, Male=20, Female=10) Type 2 Diabetes Mellitus patients belonged to the Yoga group were put through various Yogic asana for 40 days, together with diet plus diabetic medicines. All these patients performed yoga asana and pranayama for approximately 30 minutes. Per day for 40 days under the supervision and guidance of a yoga expert in the Gangadhar Meher Yogalaya Sambalpur . All the patients were of Hindu religion, so they do not hesitate to do Om chanting.

Group II (n2= 30, Male=18, Female=12) Type 2 Diabetes Mellitus patients or the control group patients, were retained on diet plus normal medical therapy . The controls were matched with respect to age, sex, BMI, duration of diabetes and glycemic base line parameters.

EXCLUSION CRITERIA:

The study exclude the

1. Patients with type 1 Diabetes Mellitus
2. Patients >25 BMI (obese person difficult to do yogic exercise)
3. Alcoholic
4. Patients already doing any kind of yogic exercise
5. Type 2 Diabetes Mellitus patients with nephropathy.
(Nephropathy was excluded by a negative dipstick test for proteins in the urine)
6. Type 2 Diabetes Mellitus patients with retinopathy.
(The subjects were subjected to a baseline ophthalmological fundus examination to exclude retinopathy.)
7. Type 2 Diabetes Mellitus patients with coronary artery disease.
(A baseline complete electrocardiogram was done in every patient to rule out any coronary artery disease.)

YOGA GROUP: 30 number of Type 2 Diabetes Mellitus subjects in the Yoga group (n1) were kept on a prescribed diet and oral antidiabetic medicines as prescribed by their clinician and they performed specific Yoga asana and pranayama for 40 days under the guidance of a Yoga expert. The important parameters before the commencement of the Yoga exercises (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 group were taught Yoga asana and pranayama. The duration of practice was for 30 to 40 minutes from 7A.M. to 8A.M. It was advised to keep bowel

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and bladder emptied prior to yogic practice. The duration of asana was 15 minutes approximately and that of pranayama was 15 minutes approximately. The practitioner was to perform shavasana in between two asana to normalize the breathing. Taking mental awareness particularly the parts of the body being activated in an asana is very important. This relaxes the mind during the yoga 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 regular practice.

S.NO	NAME OF THE ASANAS	TOTAL DURATION
1.	PAWANMUKTASANA (Toe bending & rotation, ankle rotation, Ardha titli & poorna titli asana, wrist bending & rotation, elbow bending, shoulder rotation, head bending & rotation etc.)	2min
2.	SURYANAMASKAR- round 1 (all 24 asanas)	2min
3.	SURYANAMASKAR- round 2(all 24 asanas)	2min
4.	NAUKASANA (5-8 repetitions)	1min
5	VAJRASANA with deep & slow breathing	2 min
6	MANDUKASANA (3-5 repetitions)	2 min
7	ARDHA MATSYENDRASANA (2 times both sides)	1 min
8	SHAVASANA	3 min
9	KAPALABHATI PRANAYAM	5 min
10	BHRAMARI PRANAYAM	3 min
11	ANULOM VILOM PRANAYAM	5 min
12	OM CHANTING	2 min

NAME AND DURATION OF VARIOUS ASANAS INCLUDED IN YOGIC EXERCISE

Control Group: In the control group, 30 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 40 days. 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 (HbA_{1c}) and lipid profile. The lipid profile includes serum Cholesterol, serum Triglyceride, serum Low Density Lipoprotein (LDL), serum High Density Lipoprotein (HDL), serum Very Low Density Lipoprotein (VLDL). Fasting Blood glucose (FBG), Post Prandial Blood Glucose (PPBG) and serum Cholesterol, serum Triglyceride, serum Low Density Lipoprotein (LDL), serum High Density Lipoprotein (HDL), serum Very Low Density Lipoprotein (VLDL) were analyzed by autoanalyser COBAS 400 PLUS. Glycosylated Hemoglobin (HbA_{1c}) was analyzed by indirect ELISA method.

STATISTICAL METHOD: Data related to biochemical tests were analyzed by using SPSS programme version of 16.0 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 <0.05 is considered significant.

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S.NO	Parameters	Initial Mean±S.D.	After 40 Days Mean±S.D.	P Value
1	FBG	200.03±42.67	193.07±43.89	<0.05
2	PPBG	259.5±50.39	251.33±49.02	<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 40 DAYS IN CONTROL GROUP TYPE 2 DIABETICS. (n2 = 30)

There was a decrease in the fasting blood glucose (FBG) from 200.03±42.67 mg/dl to 193.07±43.89 mg/dl, which was significant at a p value of 0.05. Postprandial Blood Glucose (PPG) after two hour also decreased from 259.5±50.39 mg/dl to 251.33±49.02 mg/dl at a p value of 0.05.

S. NO	PARAMETRS	YOGA GROUP (n1 = 30)	CONTROL GROUP (n2 = 30)	P VALUE
1	DIFF FBG	59.33±49.89	6.97±13.12	<0.05
2	DIFF PPBG	100.73±41.35	8.17±13.53	<0.05
DIFF FBG	Changes In Mean Fasting Blood Glucose At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			
DIFF PPBG	Changes In Mean Postprandial Blood Glucose At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			

TABLE 6: COMPAIRISION 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 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	Parameter	Before Yoga Mean±S.D.	After Yoga Mean±S.D.	P Value
1	HbA _{1c}	7.73±0.51	7.61±0.68	<0.05
HbA_{1c}:		Glycosylated Hemoglobin in percentage		

TABLE 7: EFFECT OF YOGA THERAPY ON GLYCOSYLATED HAEMOGLOBIN IN TYPE 2 DIABETICS (n=20)

There was a decrease of glycosylated hemoglobin from 7.73±0.5 % to 7.61±0.68%, was significant at a p value of 0.05.

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S. NO	Parameter	Initial Mean±S.D.	After 40 Days Mean±S.D.	P Value
1	HbA _{1c}	7.72±0.76	7.68±0.63	0.605
HbA_{1c}		Glycosylated Hemoglobin in percentage		

TABLE 8: CHANGES IN GLYCOSYLATED HAEMOGLOBIN BEFORE AND AFTER 40 DAYS IN CONTROL GROUP TYPE 2 DIABETICS. (n = 10)

There was a decrease of glycosylated hemoglobin from 7.72±0.76 to 7.68±0.63 %.The result was not significant at a p value of 0.05

S. NO	PARAMETRS	YOGA GROUP (n = 20)	CONTROL GROUP (n= 10)	P VALUE
1	DIFF HbA _{1c}	0.10±0.086	0.033±0.14	0.019
DIFF HbA_{1c}	Changes In Mean GLYCOSYLATED HAEMOGLOBIN At Beginning of Study And After 40 Days i.e. End of The Study in percentage.			

TABLE 9: COMPAIRISON BETWEEN CHANGES OF GLYCOSYLATED HAEMOGLOBIN 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 group and control group. With the p value <0.05 the change in glycosylated hemoglobin was better in yoga group as compared to control group.

S. NO	Parameter	Before Yoga Mean±S.D.	After Yoga Mean±S.D.	P Value
1	CHOL	177.07±9.92	166.5±6.76	<0.05
2	TG	156.10±9.16	149.90±6.63	<0.05
3	LDL	135.63±9.57	132.67±8.32	<0.05
4	VLDL	42.20±6.07	35.80±2.74	<0.05
5	HDL	42.47±6.08	48.93±4.02	<0.05
CHOL		Cholesterol In mg/dl		
TG		Triglyceride In mg/dl		
LDL		Low Density Lipoprotein In mg/dl		
HDL		High Density Lipoprotein In mg/dl		
VLDL		Very Low Density Lipoprotein In mg/dl		

TABLE 10: EFFECT OF YOGA THERAPY ON BLOOD LIPID PARAMETERS IN TYPE 2 DIABETICS. (n1 = 30)

There were decreases in the values of Cholesterol (CHOL) from 177.07±9.92 mg/dl to 166.5±6.76mg/dl, and Triglyceride from 156±9.16 mg/dl to 149.9±6.63mg/dl. There were also decreases in Low Density Lipoprotein Cholesterol (LDL) from135.63±9.57 mg/dl to 132.67±8.32 mg/dl and Very Low Density Lipoprotein Cholesterol (VLDL) levels from 42.23±6.07 mg/dl to 35.80±2.74mg/dl. There was an increase in High Density Lipoprotein Cholesterol (HDL) levels from 40.73±1.7 mg/dl to 43.54±2.1 mg/dl. All these results were significant with p value <0.05.

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S.NO	Parameter	Initial Mean±S.D.	After 40 Days Mean±S.D.	P Value
1	CHOL	223.63±50.24	219.47±47.48	0.08
2	TG	149.43±42.65	148.77±40.99	0.64
3	LDL	153.20±46.10	151.97±47.12	0.29
4	VLDL	31.70±12.50	31.27±12.48	0.02
5	HDL	36.83±0.63	36.70±7.77	0.83
CHOL		Cholesterol In mg/dl		
TG		Triglyceride In mg/dl		
LDL		Low Density Lipoprotein In mg/dl		
HDL		High Density Lipoprotein In mg/dl		
VLDL		Very Low Density Lipoprotein In mg/dl		

TABLE 11: CHANGES IN BLOOD LIPID PROFILE BEFORE AND AFTER 40 DAYS IN CONTROL GROUP TYPE 2 DIABETICS. (n2 = 30)

There were decreases in the values of Cholesterol (CHOL) from 223.63±50.24mg/dl to 219.47±47.48 mg/dl and Triglyceride from 149.43±42.65 mg/dl to 148.77±40.99 mg/dl. There were also decreases in Low Density Lipoprotein Cholesterol (LDL) from 153.20±46.10 mg/dl to 151.97±47.12 mg/dl, Very Low Density Lipoprotein Cholesterol (VLDL) levels from 31.70±12.50 mg/dl to 31.27±12.48 mg/dl. and in High Density Lipoprotein Cholesterol (HDL) levels from 36.83±0.63 mg/dl to 36.70±7.77 mg/dl. All these results were insignificant with p value >0.05, except the change in VLDL where the p value is <0.05.

S.NO	PARAMETRS	YOGA GROUP (n1 = 30)	CONTROL GROUP (n2 = 30)	P VALUE
1	DIFF CHOL	10.57±6.65	4.17±12.7	<0.05
2	DIFF TG	7.10±4.61	0.67±7.7	<0.05
3	DIFF LDL	2.97±2.07	1.23±6.3	<0.05
4	DIFF VLDL	6.46±3.66	0.43±0.97	0.16
5	DIFF HDL	-6.46±4.74	0.13±3.50	<0.05
DIFF CHOL	Changes In Mean Serum Cholesterol At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			
DIFF TG	Changes In Mean Triglyceride At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			
DIFF LDL	Changes In Mean Low Density Lipoprotein At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			
DIFF VLDL	Changes In Mean Very Low Density Lipoprotein At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			
DIFF HDL	Changes In Mean High Density Lipoprotein At Beginning Of Study And After 40 Days i.e. End Of The Study in mg/dl			

TABLE 12: COMPAIRISION BETWEEN CHANGES OF LIPID PARAMETERSLEVELS IN YOGA GROUP AND CONTROL GROUP

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Levene's Test for Equality of Variances had been done to compare the changes in parameters in between case and control group. There was significant reduction in Mean Serum Cholesterol, Mean Triglyceride and Mean Low Density Lipoprotein in yoga group in comparison to control group with a p value <0.05 . The Mean High Density Lipoprotein also increase significantly at a p value <0.05 . But the reduction in VLDL in yoga group was insignificant as compared to control group with a p value >0.05 .

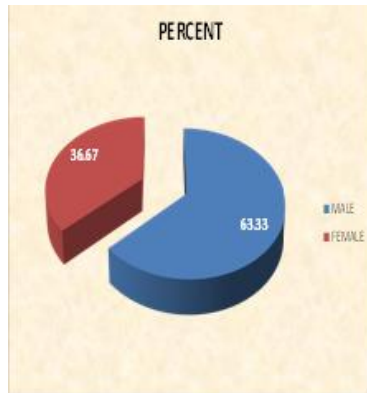


Fig. 1: SEX DISTRIBUTION OF THE SAMPLE

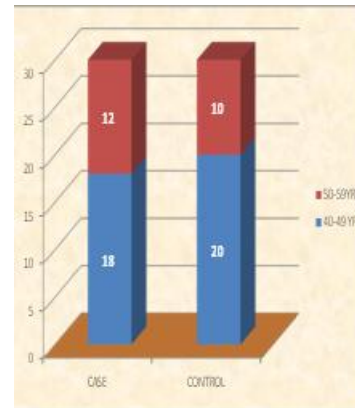


Fig. 2: AGE DISTRIBUTION OF THE SAMPLE

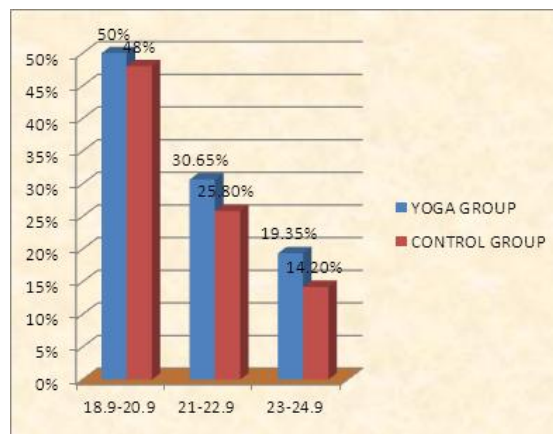


FIG. 3: BMI OF THE STUDY SAMPLE

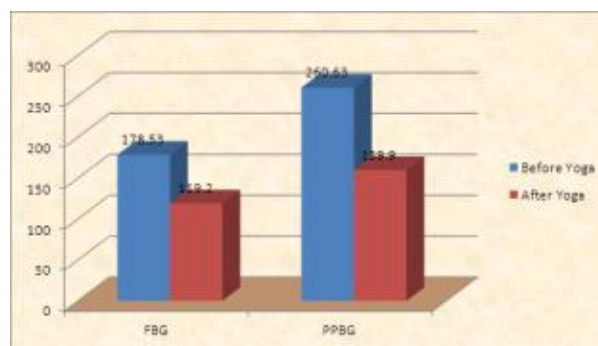


FIG. 4: EFFECT OF YOGA THERAPY ON BLOOD GLUCOSE (mg/dl) LEVELS IN TYPE 2 DIABETICS.

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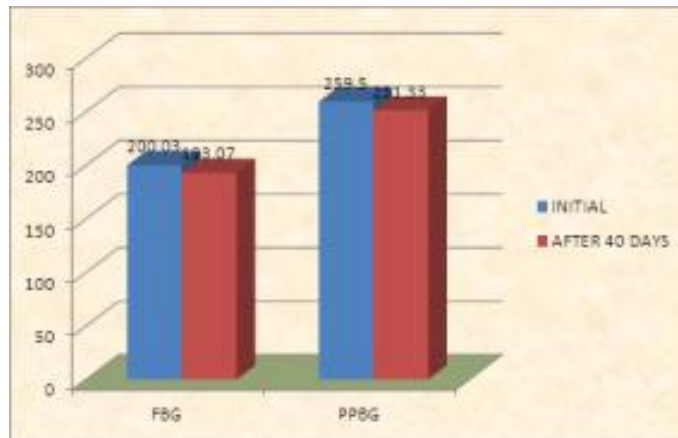


FIG. 5: CHANGES IN BLOOD GLUCOSE(mg/dl) BEFORE AND AFTER 40 DAYS IN CONTROL GROUP TYPE 2 DIABETICS

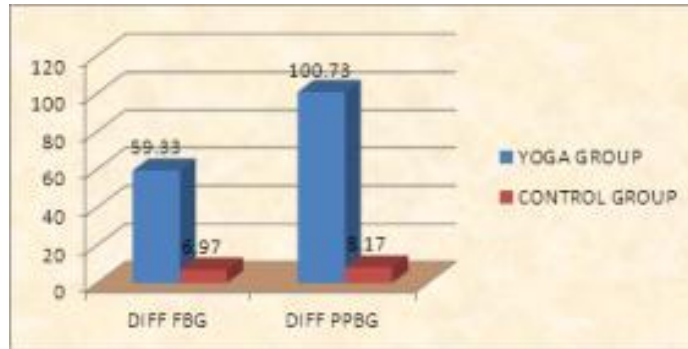


FIG. 6: COMPAIRISON BETWEEN CHANGES OF BLOOD GLUCOSE LEVELS IN YOGA GROUP AND CONTROL GROUP.

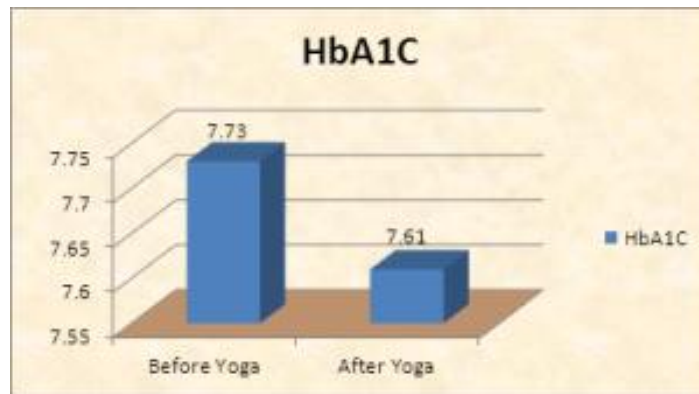


FIG.7: EFFECT OF YOGA THERAPY ON GLYCOSYLATED HAEMOGLOBIN (%) IN TYPE 2 DIABETICS

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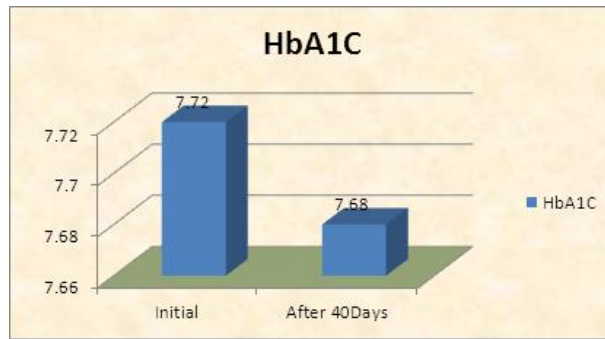


FIG. 8: CHANGES IN GLYCOSYLATED HAEMOGLOBIN BEFORE AND AFTER 40 DAYS IN CONTROL GROUP TYPE 2 DIABETICS

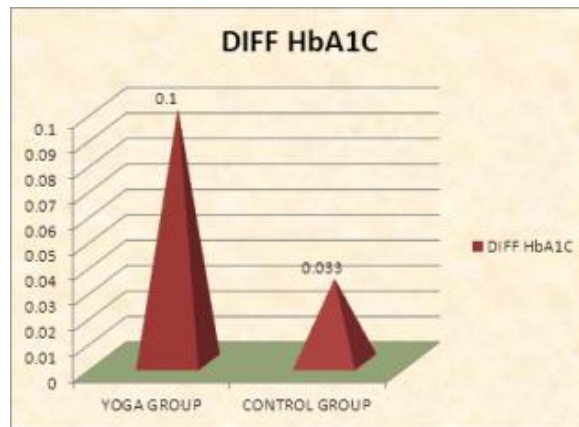


FIG. 9: COMPAIRISON BETWEEN CHANGES OF GLYCOSYLATED HAEMOGLOBIN LEVELS IN CASE AND CONTROL GROUP

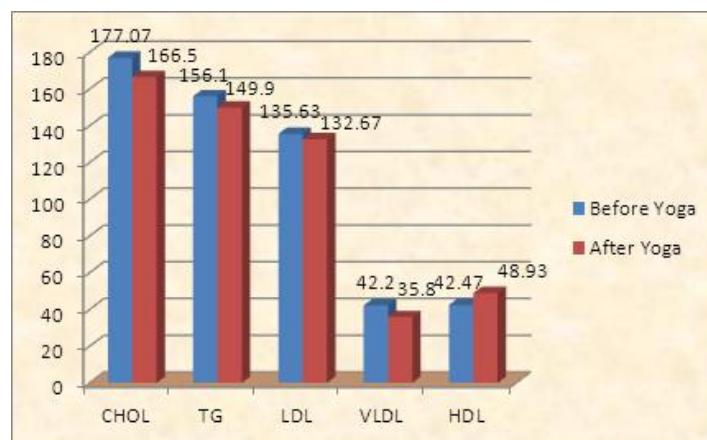


FIG. 10: EFFECT OF YOGA THERAPY ON SERUM LIPID PARAMETERS (mg/dl) IN TYPE 2 DIABETICS

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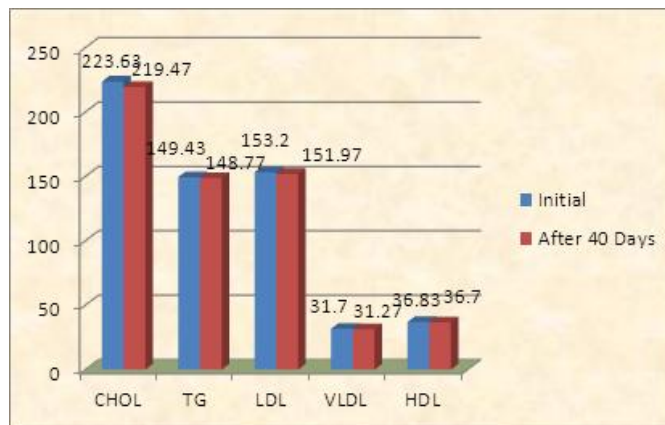


FIG. 11: CHANGES IN BLOOD LIPID PARAMETERS (mg/dl) BEFORE AND AFTER 40 DAYS IN CONTROL GROUP TYPE 2 DIABETICS

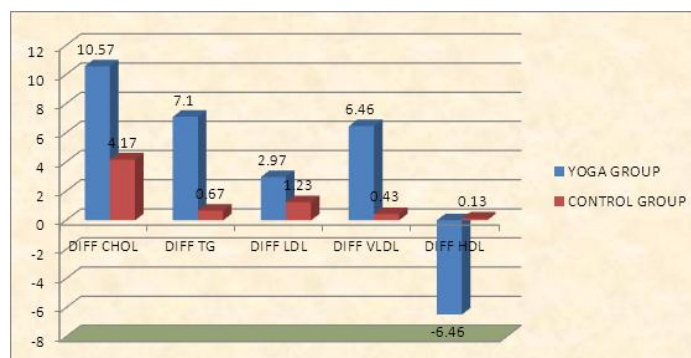


FIG. 12: COMPAIRISON BETWEEN CHANGES OF LIPID PARAMETERS LEVELS IN CASE AND CONTROL GROUP

DISCUSSION: The present study is “Effect of yoga in patients with type 2 diabetes mellitus.”

The study was conducted in the Departments of Physiology, V.S.S. Medical College Burla with the help of Department of Medicine.

The basal parameters included in the biochemical investigations are Fasting Blood glucose (FBG), Post Prandial Blood Glucose (PPBG), Glycosylated Hemoglobin (HbA1C) and lipid profile.

From the statistical analysis of the results obtained in the present study and their comparison with other published reports, it may be concluded that yoga helps in decreasing blood sugar level and keep the diabetes in control. In 2005 Manjunatha S, Vempati RP, Ghosh D, Bijlani RL.⁷ carried out a study to examine the hypothesis that yogasanas help in the treatment of diabetes mellitus by releasing insulin from the pancreas.

The observations suggest that the performance of asanas 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 asanas. The study is significant because, it has for the first time attempted to probe the mechanism by which yogasanas reduce blood sugar. In the present study there was a significant fall in the fasting blood glucose levels in the yoga group. These findings are similar to those reported by articles in the bibliography with serial number.^{8,9}

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In the present study, there was a decrease in glycosylated hemoglobin in the NIDDM patients undergoing Yoga practice. These findings are similar to those reported by articles ^{9,10} of bibliography. The exact cause of reduction in HbA1c is not known. But the reduction in glycosylated Hb protects the patients from early development of various microvascular and macrovascular complications of diabetes mellitus.

The change in lipid profile status i.e. increase in serum HDL and decrease in serum cholesterol, triglyceride, LDL and VLDL prevents the early development of comorbid condition like hypertension, coronary artery disease in case of type 2 Diabetes Mellitus patients. The improvement in lipid profile after yoga could be due to increased hepatic lipase and pancreatic lipase at cellular level, which affects the metabolism of lipoprotein and thus increase the uptake of triglyceride by adipose tissue.

By modifying the state of anxiety, yoga reduces the stress induced sympathetic activity, thus maintain a better balance between the sympathetic and parasympathetic system. Thus a decrease in sympathetic discharge and better ability to overcome stress can be taken as possible mechanisms for the improvement in lipid profile. Anand B K, 1991. ¹¹

Meditation also influence metabolic activity by reducing adrenocortical activity, long term decreased secretion of cortisol and decreased thyroid stimulating hormone, Perez-De-Albeniz A et al, 2000.¹²

All the patients in the yoga group develop a sense of wellbeing without any side effect. So they are self-motivated to continue the yoga practice as a daily routine in their life.

Practice of yoga asanas and pranayama may be helpful in reducing body weight in obese person as a result of which remote complications of diabetes mellitus may be prevented. Further studies may be conducted to prove efficacy of yoga in control of obesity.

It can be concluded that yoga asanas 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.

So yogic practice have a role in both primary and secondary prevention in diabetes mellitus. Therefore, yoga therapy may be considered as a beneficial adjuvant for management of type 2 diabetes mellitus.

ABBREVIATION:

FBG	-	Fasting Blood Glucose
PPBG	-	Post Prandial Blood Glucose
HBA_{1c}	-	Glycosylated Hemoglobin
CHOL	-	Total Cholesterol
TG	-	Total Triglyceride
LDL	-	Low Density Lipoprotein
VLDL	-	Very Low Density Lipoprotein
HDL	-	High Density Lipoprotein
DM	-	Diabetes Mellitus
NIDDM	-	Non Insulin Dependent Diabetes Mellitus
IDDM	-	Insulin Dependent Diabetes Mellitus

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