

EFFECT OF YOGA IN GLYCAEMIA & HYPERTENSION IN TYPE 2 DIABETES MELLITUS PATIENT

Sanghamitra Singha*¹ and Sarada Ningthoujam²

Post-Graduate Trainee¹, Professor²

Department of Physiology, Regional Institute of Medical Sciences, Imphal.

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*Corresponding Author

Sanghamitra Singha

Post-Graduate Trainee

Department of Physiology,

Regional Institute of Medical

Sciences, Imphal.

ABSTRACT

Background: Yoga, which primarily focused on physical exercises, breathing exercises, and meditation is a potentially economical therapy that may be used alongside medical treatment for patients with type-2 diabetes. **Objective:** To assess the effect of yoga on glycemia and hypertension in type 2 diabetes mellitus patients. **Methods:** A cross-sectional study was conducted at Department of Physiology and Medicine in collaboration with Yoga Training and Research Centre Kwakeithel, between January 2019 - June 2019, on 80 type-2 diabetes mellitus patients, classified into 1st group [n=40] without yoga intervention and 2nd group [n=40] with at least 3 months of yoga, by non-randomized trial. Baseline parameters were recorded and compared after obtaining data from two groups. Data were analysed using IBM SPSS statistics version 21 for windows. A $p < 0.05$ was taken as significant. **Results and observations:** FBS shows a non-significant difference in 2nd group ($p = 0.101$). PPBS also shows a non-significant difference in 2nd group ($p = 0.365$). Significant difference in glycosylated Hb in the 2nd group ($p = 0.009$). Resting blood pressure is compared between 1st group & 2nd group. Both systolic and diastolic readings show significant decrease in 2nd group, i.e. those who have done at least 3 months of yoga training. It is indicated by the significant p values in the last column. The SBP decreases from 143.86 ± 2.99 mmHg to 135.64 ± 0.60 mmHg and the DBP decrease from 89.08 ± 0.67 mmHg to 84.64 ± 0.59 mmHg. **Conclusion:** Yoga improves glycaemic status and controls in type 2 diabetes mellitus patients.

KEYWORDS: Yoga, Hypertension, glycaemic status, type 2 diabetes mellitus.

INTRODUCTION

Diabetes Mellitus is a public health problem in developing and developed World and 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 and WHO predicts that developing countries will bear the burden of this epidemic in the 21st century and India will be the World Diabetic Capital by 2025.^[6,9]

Yoga, practised in India over thousands of years aims at perfection of body and mind, produces consistent physiological changes and has scientific basis. It is said to help in increasing longevity and to have a therapeutic and rehabilitative effect.^[20]

Yoga is described as physical and mental technique that can be effectively used to create physical and mental well-being. Since its introduction into modern culture, yoga has enjoyed a tremendous growth in popularity as an adjunct to healthy living. The purpose of yoga is to achieve highest level of integration through the control

of the modification of mind, experience enduring health and happiness, and improve the quality of life.^[19]

The modern form of yoga is primarily focused on physical exercises (Asanas), breathing exercises (Pranayama), followed by relaxation techniques (Shavasana) or meditation. Yoga has been considered as a potentially economical therapy that may be used alongside medical treatment of diabetes.^[4] especially with the growing evidence that yoga may offer a safe and cost-effective intervention for Type 2 Diabetes mellitus (DM 2).^[16]

Several ancient scriptures make a mention of the usefulness of yoga in the treatment of diabetes mellitus and preservation of health in normal individual.^[5] And based on multiple studies, there is evidence that yoga has not only positive and long term effect on diabetes but it also delays and prevents the complications of the disease.^[6]

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, thereby regulating 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.^[6]

AIMS & OBJECTS

To assess the effect of yoga on glycemia and hypertension among type 2 diabetic patients with and without yoga for three (3) months

MATERIAL & METHODS

Study design: cross-sectional study

Study setting: Department of Physiology and Department of Medicine, Regional Institute of Medical Sciences (RIMS) Imphal, in collaboration with Yoga Training And Research Centre (YTRC) bearing registration no. 38 of 1987, Kwakeithel, Imphal.

Study duration: One (1) years: September 2019 to August 2020

Study population: Patients diagnosed with type 2 diabetes mellitus who attended Medicine department, RIMS, Imphal and type 2 diabetic patients who had done atleast 3 months of yoga at YTRC, Kwakeithel.

a) Inclusion criteria

1. Type 2 diabetes mellitus patients who had done at least 3 months of yoga at YTRC, between the age group 30 – 75 years, irrespective of sex
2. Type 2 diabetes mellitus patients attending Medicine department, RIMS, Imphal between the age group 30 – 75 years, irrespective of sex

b) Exclusion criteria

1. Those who did not want to participate
2. Patients who did not come for subsequent visits
3. Patients with past history of yoga training
4. Athletes or patients undergoing any other form of physical exercises
5. Patients with history of chronic illness like uncontrolled hypertension, angina, stroke, renal failure, COPD, tuberculosis, coronary artery disease and musculo- skeletal chest deformity

Study variables

1. Fasting blood sugar (FBS) in mg/dl
2. Post- prandial blood sugar (PPBS) in mg/dl
3. Glycosylated hemoglobin (HbA1c) in percentage (%)
4. Resting Blood pressure(SBP,DBP)

Recruitment

Patients diagnosed with type 2 diabetes mellitus attending Medicine department, RIMS, Imphal and type 2 diabetes mellitus patients who had done at least 3 months of yoga at YTRC, Kwakeithel, were screened for eligibility as per the criteria given.

Study tool

- a. Digital glucometer: one touch* simple select™ glucometer
- b. Diatek kit: diagnostic reagent for quantitative in vitro determination of glycohemoglobin in blood on photometric systems
- c. Electrocardiograph (Cardiac 108T/MK ECG machine,RMS Chandigarh, India)

Mercury sphygmomanometer (Diamond, Industrial Electronic & Allied products, Pune, India).

1. Littmann stethoscope classic 3
2. ECG machine (Cardiart 108T/MK),timer

Procedure & Intervention

For FBS * PPBS: A drop of blood was collected using the automatic plunger and the glucometer strip in the morning after a minimum of eight (8) hours of fasting. BP was recorded with a mercury sphygmomanometer in supine position in right upper arm by auscultatory method using a stethoscope. Three (3) readings were taken at an interval of 15 minutes; each and average of the three values was taken.

Data handling and analysis

Data were entered and analysed using ibm spss statistics version 21 for windows. Datas were summarized using descriptive statistics like percentages for categorical data, means (standard deviation) and median for continuous data. student's t- test for data with normal distribution, mannwhitney u- test for data with skewed distribution and paired t- test were used. a p value of < 0.05 was taken as significant.

Ethical issues

The study was carried out after obtaining clearance from the research ethics board (reb), rims, imphal. written informed consent was taken from each participant. privacy and confidentiality were maintained through-out the study by limiting the identifying variables to the minimum and by using unique identification number. data collected were not linked to identify the individual in any way or data collection process did not harm the participants in any way. access to the data collected was made available only to the investigator and guides. presentation of data was made collectively without identifying the individuals.

14. Conflict Of Interest

The study was conducted in collaboration with yoga training and research centre (ytrc) bearing registration no. 38 of 1987 kwakeithel, imphal. the centre had no influence on the findings related with the study and that the study was conducted independently under the supervision of my guides.

RESULTS AND OBSERVATIONS

Table 1: Glycaemic status of 1st and 2nd group.

| Glycaemic status | 1 st group, participants without yoga(n=40) | 2 nd group, participants who are doing yoga(n=40) | p value |
|----------------------------|--|--|---------|
| Fasting blood sugar | 113.48±34.71 | 112.98±33.40 | 0.101 |
| Post –prandial blood sugar | 157.12±55.58 | 156.76±55.47 | 0.365 |
| Glycosylated hemoglobin | 6.18±1.37 | 6.11±1.34 | 0.009 |

Table 2: Resting blood pressure of 1st and 2nd group

| Resting Blood Pressure (mmHg) | 1 st group, participants without yoga(n=40) | 2 nd group, participants who are doing yoga(n=40) | p value |
|-------------------------------|--|--|---------|
| Systolic BP | 143.86±2.99 | 135.64±0.60 | 0.005 |
| Diastolic BP | 89.08±0.67 | 84.64±0.59 | 0.000 |

CONCLUSION

Based on the findings of our present study, it can be concluded that diabetic patients who underwent at least 3 months yoga training, besides oral hypoglycaemic agents showed a significant improvement in hypertension (in terms of resting BP) and glycaemic status as compared to diabetic patients who were on only medications. With yoga training, glycaemic status parameters also show statistically significant improvement in these patients.

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