

## Original Research

### Assessment of effect of alternate walking and yoga on blood sugar levels in type 2 diabetes mellitus subjects

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#### ABSTRACT:

**Background:** Diabetes mellitus (DM) is a group of metabolic disorders characterized by chronic hyperglycemia due to relative insulin deficiency or resistance or both. The present study was conducted to assess the effect of alternate walking and yoga on blood sugar levels in type 2 diabetes. **Materials & Methods:** 60 type II DM patients of both genders were divided into 3 groups of 20 each. group I was only walking group, group II was only yoga and group III was yoga and walking alternate weeks. Pre and post intervention fasting, post prandial blood sugar level (BSL) and appraisal of diabetes scale score (ADS) scores were recorded. **Results:** There were 12 males and 8 females in group I, 11 males and 9 females in group II and 8 males and 12 females in group III. FBSL (mg/dl) pre- operative and post- operative in group I was 160.2 and 128.2, in group II was 134.6 and 120.1 and in group III was 162.4 and 138.2. PPBSL (mg/dl) pre- operative and post- operative in group I was 214.6 and 172.4, in group II was 210.2 and 170.2 and in group III was 236.2 and 196.4. ADS pre- operative and post- operative in group I was 28 and 20, in group II was 26.2 and 22 and in group III was 27 and 20. The difference was significant ( $P < 0.05$ ). **Conclusion:** Walking, yoga and alternate walking with yoga were found to be efficient in improving BSL and glycaemic control in subjects with type 2 diabetes mellitus.

**Key words:** Blood sugar level, Diabetes mellitus, Yoga

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#### INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic disorders characterized by chronic hyperglycemia due to relative insulin deficiency or resistance or both. India with an estimated 31 million diabetics in 2000 and 79 millions by the year 2030 has the highest number of type 2 diabetics in the world.<sup>1</sup> Although patients with DM can have a reasonably normal life style, its late complications result in reduced life expectancy and considerable utilization of health resources.<sup>2</sup> The successful management of diabetes revolves around an individually tailored nutritional plan, exercise regimen, use of oral hypoglycemic agents and / or insulin. Regular monitoring by patient and physician, and supportive education are an integral and important part of management.<sup>3</sup>

Diabetes Mellitus is most commonly assessed using the fasting plasma glucose test. The test is positive if the fasting blood glucose level is greater than or equal to 126 mg/dl. The post prandial blood sugar levels are

indicative of diabetes when glucose level is equal to or greater than 200 mg/dl. Glucose built up in the body leads to acute and long-term complications which affects the overall health of the patient.<sup>4</sup>

Physical activity in the form of aerobic exercise and a structured intervention are effective in improving glycemic control and is a preventive step towards acute and long-term complications of type 2 diabetes mellitus. The American College of Sports Medicine (ACSM) defines Aerobic exercise as any exercise that is rhythmic, continually maintained and involves large muscle groups. According to the American Diabetes Association, moderate intensity aerobic exercise plays a key role in managing diabetes.<sup>5</sup> The present study was conducted to assess the effect of alternate walking and yoga on blood sugar levels in type 2 diabetes.

**MATERIALS & METHODS**

The present study comprised of 60 type II DM patients of both genders. All agreed to be the part of the study with their written consent.

Data such as name, age, gender etc. was recorded. All were divided into 3 groups of 20 each. group I was only walking group, group II was only yoga and group III was yoga and walking alternate weeks. Pre-intervention fasting, post prandial blood sugar level

(BSL) and appraisal of diabetes scale score (ADS) scores were taken. First 3-5 sessions were performed by the patients under supervision for better understanding of achieving an intensity of 13-15 on Borg’s scale. Post-intervention fasting, post prandial BSL and ADS scores were obtained at end of 4 weeks. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Groups	Group I	Group II	Group III
Status	Walking	Yoga	Walking and yoga
M:F	12:8	11:9	8:12

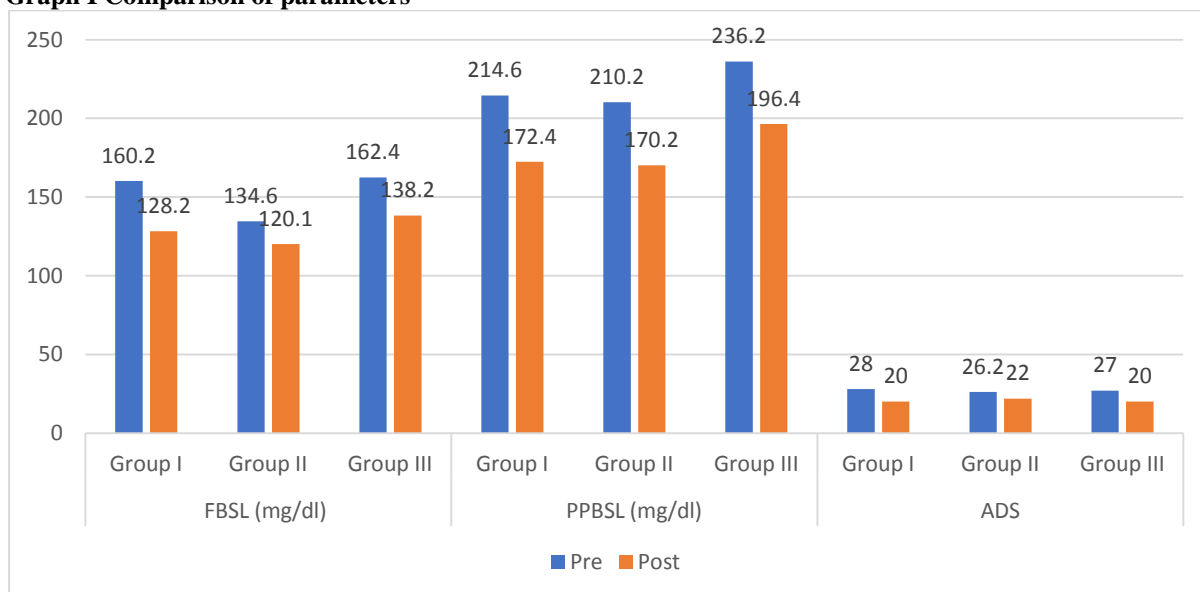
Table I shows that there were 12 males and 8 females in group I, 11 males and 9 females in group II and 8 males and 12 females in group III.

**Table II Comparison of parameters**

Parameters	Groups	Pre	Post	P value
FBSL (mg/dl)	Group I	160.2	128.2	0.01
	Group II	134.6	120.1	0.05
	Group III	162.4	138.2	0.02
PPBSL (mg/dl)	Group I	214.6	172.4	0.01
	Group II	210.2	170.2	0.04
	Group III	236.2	196.4	0.01
ADS	Group I	28	20	0.05
	Group II	26.2	22	0.05
	Group III	27	20	0.03

Table II, graph I shows that FBSL (mg/dl) pre- operative and post- operative in group I was 160.2 and 128.2, in group II was 134.6 and 120.1 and in group III was 162.4 and 138.2. PPBSL (mg/dl) pre- operative and post- operative in group I was 214.6 and 172.4, in group II was 210.2 and 170.2 and in group III was 236.2 and 196.4. ADS pre- operative and post- operative in group I was 28 and 20, in group II was 26.2 and 22 and in group III was 27 and 20. The difference was significant (P< 0.05).

**Graph I Comparison of parameters**



**DISCUSSION**

Physical activity is unanimously considered a cornerstone in the management of type 2 diabetes

mellitus (T2DM).<sup>6</sup> It improves blood glucose and cardiovascular risk factors, contributes to weight loss, and improves general well-being, likely playing a role

in the prevention of chronic diabetes complications.<sup>7</sup> A meta-analysis of structured exercise interventions, consisting of aerobic training, resistance training, or both for at least 12 weeks, concluded that regular exercise may lower HbA1C by an average of 0.67% in diabetic subjects, as compared with standard care, even in the absence of a significant reduction in BMI.<sup>8</sup> Interestingly, both aerobic and resistance exercise may improve metabolic features and body composition, also reducing liver fat content, in people with T2DM, although combined exercise may have greater effects on blood glucose.<sup>9</sup> It is noteworthy that both physical inactivity and increased sedentary time have been recognized as distinct and independent risk factors for cardiovascular disease, T2DM, and all-cause mortality.<sup>10</sup> The present study was conducted to assess the effect of alternate walking and yoga on blood sugar levels in type 2 diabetes.

We found that there were 12 males and 8 females in group I, 11 males and 9 females in group II and 8 males and 12 females in group III. Esha et al<sup>11</sup> in their study 30 patients with type 2 diabetes were randomly allocated in 3 groups- walking, yoga and alternate walking and yoga. Participants were given 4 weeks intervention with 3-5 supervised sessions and follow up every week. Pre-intervention values were obtained i.e. Fasting and Post-Prandial Blood sugar levels (BSL) and Appraisal of Diabetes Scale (ADS) score. Post intervention values were obtained after 4 weeks. Intra group comparison for fasting and post prandial BSL for all 3 groups is significant (p value < 0.05) pre and post intervention. On inter group comparison, no significant difference found between all 3 groups for fasting, post prandial BSL and ADS score. Intervention given to all 3 groups for fasting, post prandial BSL and ADS score.

We observed that FBSL (mg/dl) pre- operative and post- operative in group I was 160.2 and 128.2, in group II was 134.6 and 120.1 and in group III was 162.4 and 138.2. PPBSL (mg/dl) pre- operative and post- operative in group I was 214.6 and 172.4, in group II was 210.2 and 170.2 and in group III was 236.2 and 196.4. ADS pre- operative and post- operative in group I was 28 and 20, in group II was 26.2 and 22 and in group III was 27 and 20. The American Diabetes Association (ADA) recommends that most adults with diabetes accumulate at least 150 min of moderate to-vigorous intensity aerobic exercise per week, spread over at least three days per week, avoiding more than two consecutive days without activity. However, shorter durations (at least 75 min per week) of vigorous intensity or interval training may be sufficient and can be prescribed in these patients, especially in younger and more physically fit individuals. In addition, adults with diabetes should engage in two to three sessions per week of resistance exercise, on non-consecutive days. Yoga and tai chi may be included in exercise programs, as an alternative to traditional exercise training. Flexibility and balance exercises are also

recommended for older subjects with diabetes, to improve joint mobility and reduce falls. Finally, all adults with T2DM should decrease the amount of time spent in sedentary behavior, interrupting prolonged sitting with short bouts of light activity about every 30 min, for blood glucose and general health benefits. This latter recommendation is intended to be additional to, and not a replacement for, increased structured exercise.<sup>12</sup>

## CONCLUSION

Authors found that walking, Yoga and alternate walking with yoga were found to be efficient in improving BSL and glycaemic control in subjects with type 2 diabetes mellitus.

## REFERENCES

- Colberg SR, Sigal RJ, Fernhall B, et al. Exercise and Type 2 Diabetes: The American College of Sports Medicine and the American Diabetes Association: joint position statement. *Diabetes Care* 2010; 33(12): 147–167.
- American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription. Philadelphia: Lippincott Williams & Wilkins, 2000. Print.
- M. Krotkiewski, P. Lonnroth, and K. Mandroukas. The effects of physical training on insulin secretion and effectiveness and on glucose metabolism in obesity and Type 2(non-insulin-dependent) diabetes mellitus. *Diabetologia* 1985; 28(12): 881–890.
- Hill JO. Walking and Type 2 Diabetes. *Diabetes Care* 2005 Jun; 28(6): 1524–1525.
- Malhotra V, Singh S, Singh KP. Effects of yoga asanas and pranayama in non-insulin dependent diabetes mellitus. *IJTK*. April, 2004; 3(2): 162–167.
- García-Pérez LE, Alvarez M, Dilla T, Gil-Guillén V, Orozco Beltrán D. Adherence to therapies in patients with type 2 diabetes. *Diabetes Ther* 2013 Dec; 4(2): 175–194.
- Carey MP, Jorgensen RS, Weinstock RS, Sprafkin RP, Lantinga LJ, Carnrike CL Jr, Baker MT, Meisler AW. Reliability and validity of the appraisal of diabetes scale. *J Behav Med* 1991 Feb; 14(1): 43–51.
- Francois ME, Little JP. Effectiveness and Safety of High Intensity Interval Training in Patients With Type 2 Diabetes. *Diabetes Spectrum: A Publication of the American Diabetes Association*. 2015; 28(1): 39–44.
- Yekefallah L, Azimi H, Sadeghi T, Roustaei M. The Effect of Walking and Yoga on Blood Glucose Levels in Type II Diabetes. *Int J Rev Life Sci* 2015; 5(9): 1079–1084.
- Chimkode SM, Kumaran SD, Kanhere VV, Shivanna R. Effect of yoga on blood glucose levels in patients with type 2 diabetes mellitus. *J Clin Diagn Res* 2015 Apr; 9(4): 1–3.
- Esha K, Prajakta S, Ashok S, Parag S. Effect of alternate walking and yoga on blood sugar levels in type 2 diabetes. *Ind J Physiol Pharmacol*. 2019;63(1):16-20.
- American Diabetes Association. Facilitating behavior change and well-being to improve health outcomes: standards of medical care in diabetes – 2020 *Diabetes Care* 2020;43 (Supplement 1): 48-65.