

**Original research articles:**

## **Effect of yoga asanas as an adjuvant measure in type 2 diabetes patients receiving antidiabetics**

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### **Abstract**

**Objective:** To determine the wellbeing of type II diabetes patients by using wellbeing assessment scale and to determine the efficacy of adjuvant yoga therapy on the degree of glycaemic control.

**Methods :**Patients(n=60) with type II diabetes of  $\leq 3$  years duration on monotherapy, (either metformin, glibenclamide, glimipiride,gliclazide, glipizide) previously not exposed to yoga therapy & age between 30-60 years are recruited and randomly allocated into two groups after informed consent.

Study group(n=30): yoga therapy is given along with antidiabetic monotherapy

Control group(n=30): they are given only antidiabetic monotherapy Glycaemic control , weight, waist circumference and Wellbeing assessment ( done by questionnaire) are done for both the groups at the beginning of study and every fortnight thereafter.

**Results:** In study group the body weight mean decreased from the initial mean of 65.8 to 62.5 which is statistically significant(p value <0.05). waist circumference decreased from 94.77 to 90.7 which is statistically significant (p value <0.05).statistically highly significant p value was noted in the Well being parameter which decreased from a mean of 10.03 to 6.03. Regarding the glycaemic control fasting blood sugar mean decreased from 171.90 to 130.23 which is significant. Postprandial sugar decreased from 270.87 to 186.43 which was highly significant with p value of <0.001. HbA1C mean value decreased from 8.2 to 7.65 which was not significant. Control group showed mild insignificant reduction in body weight, waist circumference, and significant reduction in Fasting and postprandial blood sugar, HbA1C. The well being score mean reduced <0.5 from the baseline value, but not statistically significant

**Conclusion:** This study concludes adjuvant yoga improves morale, reduces stress and offers adequate control of diabetes than drug alone.

**Keywords:** yoga, diabetes, well being, glycaemic control

## Introduction

Diabetes a chronic medical disorder with its associated physical morbidity and economic burden causes poor psychological, social well being adding to poor control of a established diabetes<sup>1</sup>.

Many of diabetic patients complain about their quality of life being marked by ill health & emotional insecurity. WHO slogan says” it is not sufficient to add years to life, but it is more important to add life to to years”.<sup>2</sup> Yoga therapy works by rejuvenating the main gland involved with diabetes- The Pancreas. High stress level can overload the blood with high sugar as a response to stress<sup>3</sup>.

An ideal health package should include counseling, nutrition, physical exercise, meditation & prayer for the promotion of positive mind set and create a feeling of wellbeing <sup>4</sup>. yoga therapy as an adjuvant is considered needed because of the balance created in the neurons and the endocrine system which directly influences all other systems and organs of the body

## AIM

To study the beneficial effect of adjuvant Yoga in diabetic control.

## Objective

- 1.To determine the degree of physical & mental wellbeing of type II diabetes patients on adjuvant yoga therapy by using wellbeing assessment scale
- 2.To determine the efficacy of adjuvant yoga therapy on the degree of glycemc control

## Materials and Methods

This study was a Prospective, Randomized, Comparative, Open labelled, Case Control Study, conducted in Out Patients attending diabetic clinic & yoga clinic.

The study was started after obtaining approval from Institutional Ethics Committee. Written informed consent in regional language obtained from patients, willing to participate in the study. Formal permission sought from department of Diabetology and Department of Yoga therapy.

## Selection criteria

Patients who are already practising yoga, Patients who are unwilling to do yoga, who are unable to do yoga & Patients with associated co-morbid medical conditions were excluded from the study

The study duration spanned for 6 months.

Type II diabetes patients aged between 30-60 years, both sexes with less than 3 years of onset and treatment on monotherapy were recruited and allocated into study & control group; diabetic patients who are on either metformin 500mg tds, or glibenclamide 5mg bd or glimepiride 1mg od, or gliclazide 5mg od as prescribed by diabetologist were enrolled in this study.

Study group(n=30): yoga therapy is given along with antidiabetic monotherapy; Control group(n=30): they are given only antidiabetic monotherapy

The two groups were assessed for continuous 3 months following enrollment in the study. The required sample size of 60 patients were reached by 6 months of time.

Yoga therapy is provided to the study group at the first visit for one hour and he is trained to do the same for one week under supervision by yoga therapist. Once patient is trained & confident he is advised to do the same daily at home for one hour.

Glycemc control , weight, waist circumference and Wellbeing assessment ( done by questionnaire) are done for both the groups at the beginning of study and every fortnight thereafter.

**1. Body Weight**<sup>5</sup>

Gender	Mild weight loss	Moderate weight loss	Appreciable weight loss
Both	≤3kg from baseline weight	3- 5 kg loss from baseline	>5 kg loss

**2. waist circumference**<sup>6</sup>

Gender- normal references	Mild decrease	Moderate decrease
Female (≤ 80 cm) Male (≤ 90cm)	Upto 5 cm decrease from baseline	More than 5 cm decrease from baseline

**Warwick Edinburgh mental wellbeing score**<sup>7</sup>

s.no	parameters	Scoring scale			
		0	1	2	3
1	Feeling unwell/ in need of rest/ tonic/ health drink				
2	Aches and pains/ feeling stressed/ insomnia				
3	Feeling bad tempered- not at all/ occasional/ frequent / always				
4	Feeling not energetic/ not confident/ not relaxed				
5	Feeling not interested in new things/ not able to deal with problems				

Score : 0-5- mildly affected, 6-10 moderately affected, 11-15 severely affected.

The study group patients were counseled by yoga consultant regarding diet & life style modifications and the required adjuvant yoga therapy. The yoga therapist educated and supervised the yoga postures, mudras, breathing exercises & meditation. Patients

advised to practice these measures daily, the well being assessed during follow up.

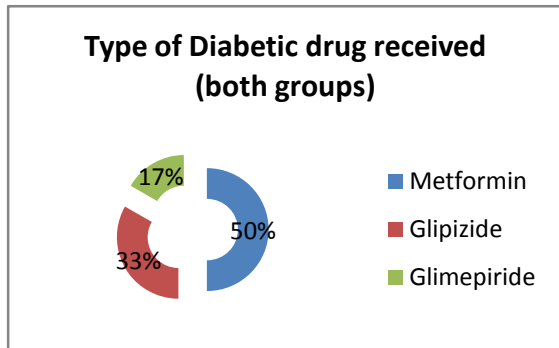
The study group patients were trained with four types of yoga asanas<sup>8</sup>. 1.Surya mudra<sup>13</sup>,  
2.Sashangasana,3.Vajrasana,4.Bhujangasana.

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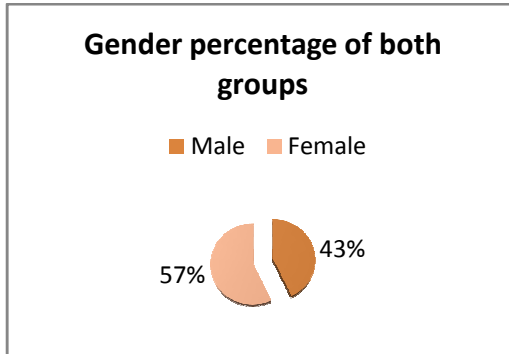
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**Results**

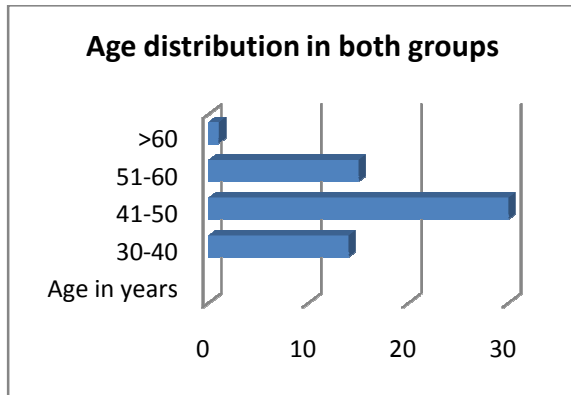
**Figure-2a**



**Figure- 2b**



**Figure- 2c**



**Figure- 2d**

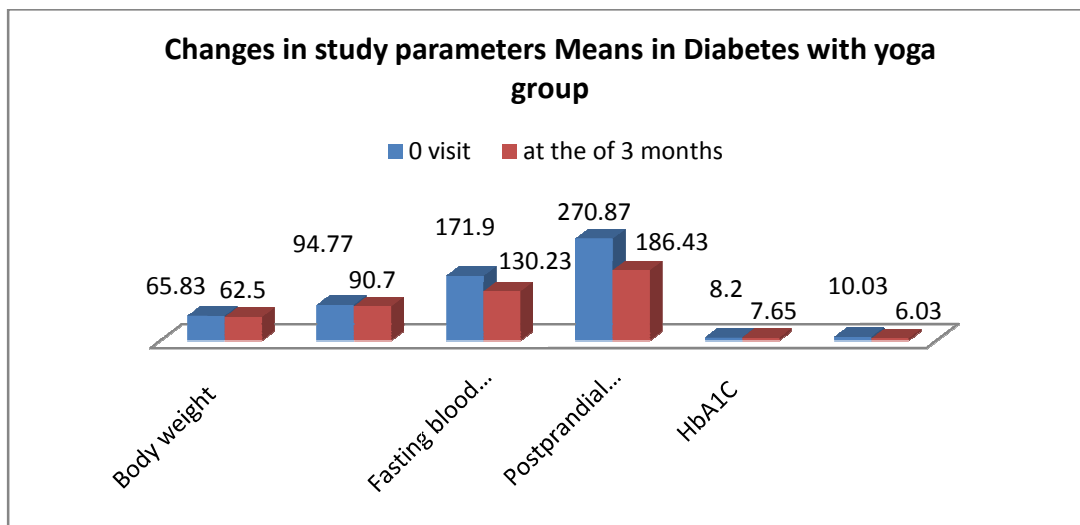


Figure -2e

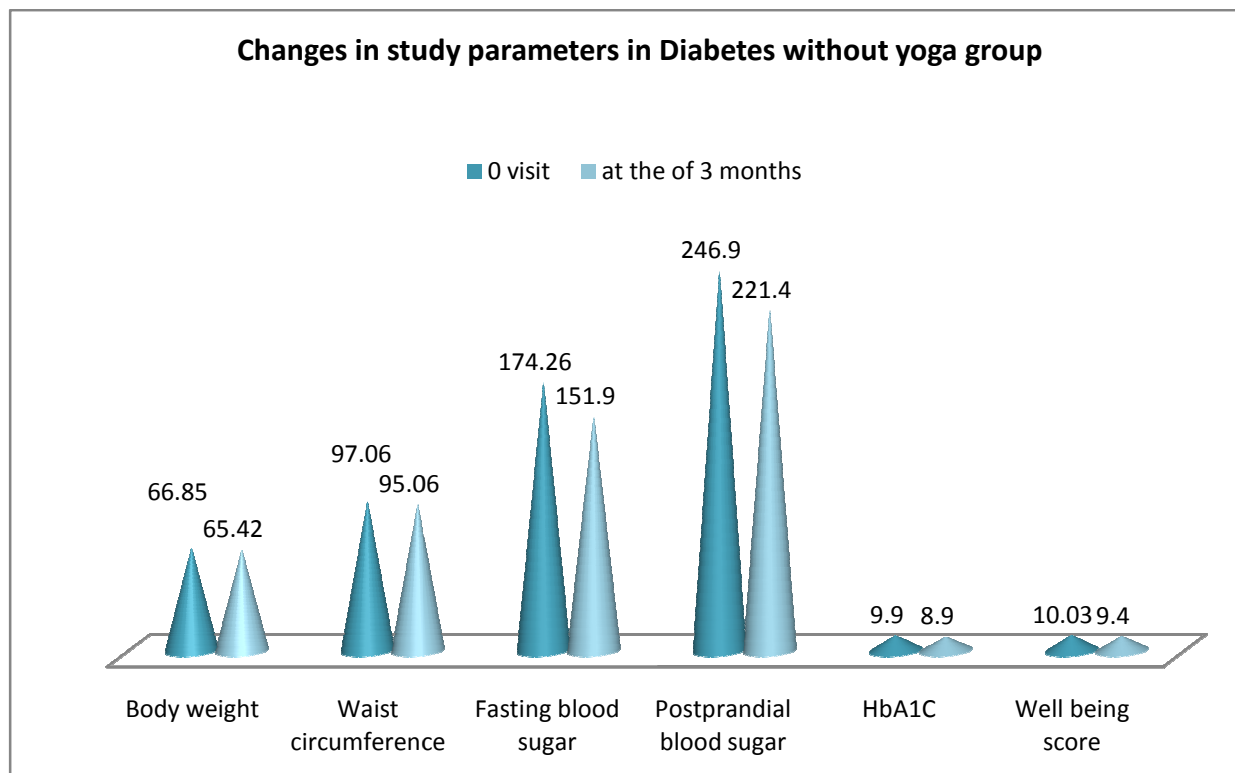


Table- 1a

Paired samples test- Diabetes+Yoga (Study group)					
		Mean	N	Std. Deviation	P value
Pair 1	WC	94.77	30	10.444	0.000**
	WC3	91.10	30	9.977	
Pair 2	bodywtinitial	65.83	30	9.728	0.000**
	bodywt3	63.733	30	8.3053	
Pair 3	FASTING	171.90	30	36.768	0.000**
	FBS3	130.23	30	21.590	
Pair 4	PP	270.87	30	58.351	0.000**
	PP3	186.43	30	29.865	
Pair 5	HB	2.00	30	.000	0.000**
	HB1	1.57	30	.504	

**Table-1b**

Paired Samples Statistics- control group					
		Mean	N	Std. Deviation	P value
Pair 1	Body WT 0 visit	66.85	30	8.602	0.271
	Body WT-3 <sup>rd</sup> mon	64.85	30	8.062	
Pair 2	WC-0 visit	97.06	30	9.539	0.06
	WC-3 <sup>rd</sup> mon	93.86	30	9.274	
Pair 3	FBS 0 visit	171.90	30	52.61	0.001*
	FBS -3 <sup>rd</sup> mon	130.23	30	27.04	
Pair 4	PPBS 0 visit	270.87	30	51.4	0.000**
	PPBS- 3 <sup>rd</sup> mon	186.43	30	39.88	
Pair 5	HbA1c-0 visit	2.00	30	2.21	0.000**
	HbA1c-3 <sup>rd</sup> mon	1.57	30	1.62	
Pair 6	Well being score-0 visit	10.03	30	1.63	0.410
	Well being score-3 <sup>rd</sup> mon	9.46	30	1.30	

**Table-2a**

**Chi-Square Tests**

s	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.750 <sup>a</sup>	30	.051
Likelihood Ratio	40.491	30	.069
Linear-by-Linear Association	9.413	1	.004
N of Valid Cases	30		

a. 42 cells (100.0%) have expected count less than 5. The minimum expected count is .07.

**Table-2b**  
**With yoga**

<b>Chi-Square Tests</b>			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	79.167 <sup>a</sup>	30	.000
Likelihood Ratio	64.609	30	.000
Linear-by-Linear Association	23.044	1	.000
N of Valid Cases	30		
a. 42 cells (100.0%) have expected count less than 5. The minimum expected count is .07.			

In study group the body weight mean decreased from the initial mean of 65.8 to 62.5 which statistically significant (p value <0.05). Waist circumference decreased from 94.77 to 90.7 which is statistically significant (p value <0.05). Statistically highly significant p value was noted in the Well being parameter which decreased from a mean of 10.03 to 6.03.

Regarding the glycemic control fasting blood sugar mean decreased from 171.90 to 130.23 which is significant. Postprandial sugar decreased from 270.87 to 186.43 which was highly significant with p value of <0.001. HbA1C mean value decreased from 8.2 to 7.65 which was not significant.

Control group showed mild insignificant reduction in body weight, waist circumference, and significant reduction in Fasting and postprandial blood sugar, HbA1C. The well being score mean reduced < 0.5 from the baseline value, but not statistically significant.

All results were expressed as the mean  $\pm$  SD. All statistical test were two tailed and an alpha level of 0.05 was set as the level of significance. Power of

this study = 80% (1-beta); beta=20%; alpha = 95%= 1.96.

**Discussion**

**Benefits of these yogasanas**

Diabetes patients generally have poor metabolic rates which can increase sugar level and weight. Regular practice of surya mudra will help boost metabolic rate thus ensuring loss of weight and lowering of blood sugar level. Sashangasana regulates metabolism and improves immune system. Bhujangasana improves function of pancreas and blood circulation. Vajrasana relieves stress and fatigue & helps in weight loss<sup>13</sup>. Patients who were obese at the beginning of the study showed reduction of bodyweight by 4-5 kg than patients who were between 52-56kg. Patients initially with poor wellbeing score showed substantial improvement in well being than that of other members.

Previous study on Yoga effect on oxidative stress in diabetes concludes, yoga can be used as an effective therapy in reducing oxidative stress in type 2 diabetes<sup>14</sup>. Yoga is also beneficial in improving glycemic parameters and BMI and can be

administered as an add-on therapy to standard lifestyle interventions. Many other study showed Yogic therapy works by rejuvenating the main glands involved with diabetes, like the pancreas that is involved with insulin release<sup>15</sup>. The stress glands also seem to be implicated, where a high stress level can overload the blood with high sugar as a response to stress<sup>16</sup>. Many international studies have reported the beneficial effect of the practice of yoga on diabetes. Some studies have mentioned up to 65 per cent beneficial effect of yogic therapy. Medical scientist K N Udupa has even mentioned five cases of juvenile diabetes completely controlled by yogic treatment<sup>17</sup>. This study conducted on adult Type II diabetes on monotherapy who practised adjuvant 4 types of yoga asanas showed marked improvement in well being and moderate weight loss which was not observed in control group. These two factors improved the morale and reduced the stress

component contributing to appreciable glycemic control to the study group patients.

#### **Limitations**

Dietary habits of the enrolled patients of both the groups were not standardized though advice regarding optimal diabetic diet was given. BMI would have been better index than initial body weight to reflect the real benefits as the initial body weight varied between 52kg to 82kg.

In both the groups patients received 4 types of antidiabetic drug, optimal control with the type antidiabetic drug received is not considered in this study. All the patients of both the groups were overweight, obese with varying baseline weight. Obese patients with more than 65 kg showed better weight reduction than overweight patients.

#### **Conclusions:**

This study stresses the importance of adjuvant yoga in achieving glycemic control and wellbeing in established diabetes mellitus.

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Diabetes Mellitus & Yoga

VAJRASANA<sup>11</sup>



SASHANGASANA<sup>10</sup>



BHUJANGASANA<sup>12</sup>



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