



## EFFECT OF YOGA AND BRISK WALKING ON SELECTED PHYSIOLOGICAL VARIABLES (BLOOD PRESSURE) OF NON-INSULIN DEPENDENT DIABETIC PATIENTS

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### Abstract:

The purpose of the study was to find out the effect of yoga and brisk walking on selected physiological variables of Non Insulin Dependent Diabetic Patients. For this purpose, Forty five (N=45) aged between 35 to 45 years working men in a private company at Hosur, Tamilnadu, India were randomly selected as subjects. The training programme was designed for 12 weeks and Experimental group I (n=15) underwent Yoga practices, Experimental group II (n=15) underwent brisk walking for 5 days per week for 12 weeks, group III acted as Control group, they were not allowed to involve any type of physical activities. Yoga and brisk walking were selected as Independent variables. Systolic and diastolic blood pressures were selected as dependent variables. The selected physiological variables were assessed by using the digital sphygmomanometer. Pre test and Post test were conducted on selected physiological variables. The collected data were analysed by using Dependent 't - test' and Analysis of covariance (ANCOVA) was applied to find out the effect of Yoga and brisk walking on selected physiological variables and scheffe's Post hoc method was used for testing the significance between paired adjusted means. The level of significance was 0.05. The results of the study indicated that the effect of yoga and brisk walking had significantly improved the systolic and diastolic blood pressure of Non Insulin Dependent Diabetic Patients.

**Key Words:** Yoga, Brisk Walking, Systolic Blood Pressure, Diastolic Blood Pressure, NIDDM & ANCOVA.

### Introduction:

Diabetes is a condition where the body fails to utilize the ingested glucose properly. This could be due to lack of the hormone insulin or because the insulin that is available is not working effectively. (Dr. Ananya Mandal, MD)

Yoga means the experience of oneness or unity with inner being. This unity comes after dissolving the duality of mind and matter into supreme reality. It is a science by which the individual approaches truth. The aim of all yoga practice is to achieve truth where the individual soul identifies itself with the supreme soul or God. Yoga has the surest remedies for man's physical as well as psychological ailments. It makes the organs of the body active in their functioning and has good effect on internal functioning of the human body. Yoga is a re-education of one's mental process, along with the physical. The stages of yoga are eight, *Yama, Niyama, Pranayama, Pratyahara, Dharana, Dhyana and Samathi*, they are all integrated (Iyengar, B.K.S. 1999).

Walking also called ambulation is the main form of animal locomotion on land, distinguished from running and crawling. When carried out in shallow waters, it is usually described as wading and when performed over a steeply rising object or an obstacle it becomes scrambling or climbing. The word walk is descended from the Old English *welcan* "to roll". Brisk walking is the walking for 4 miles per hour of pace. It should not be too slow or too fast.

The Blood pressure is the pressure measured in the vascular system that is associated with cardiac contraction (systolic) and relaxation (diastolic). "The highest level to which the arterial blood pressure rises during the systolic ejection of blood from the Ventricle" "Systolic Blood Pressure is the highest blood pressure of the Cardiac cycle occurring immediately after systolic of the Ventricles of the heart. "Diastolic Pressure is the lowest arterial blood pressure of the cardiac cycle occurring during diastolic of the heart" and the Pressure that is exerted by the blood upon the walls of the blood vessels and especially arteries and that varies with the muscular efficiency of the heart, the blood volume and viscosity, the age and health of individual, and the state of the vascular wall.

### Methodology:

Forty five (N=45) Non -Insulin dependent diabetic patients working in private companies in Hosur, Krishnagiri district, Tamil Nadu, India, were selected as subjects. The selected subjects were divided into three equal groups of fifteen each namely experimental group I underwent yogic practices, Experimental group II underwent brisk walking for 5 days per week for 12 weeks and group III acted as control group. The age group of the subjects ranged from 35 to 45 years. However all the three groups were advised to continue the medicines as per the recommendations of their doctors (Physicians). Systolic and Diastolic blood pressure were selected as physiological variables. Digital Sphygmomanometer were used to find the selected physiological variables. The Experimental group I (Yoga) includes Loosening exercise, Surya Namaskar, Asana, Pranayama, Meditation and Yoga nidra. Experimental group II (Brisk walk) underwent brisk walk for 45 minutes continuously without any

rest Control Group had no special training.

**Statistical Analysis:**

The collected data were analysed by using Dependent ‘t - test’ Analysis of covariance (ANCOVA) was applied to find out the effect of Yoga and brisk walking on selected physiological variables and scheffe’s Post hoc method was used for testing the significance between paired adjusted means. The level of significance was 0.05.

**Analysis of Data:**

Table 1: The Pre and Post Test Data and ‘t’ Ratio on Systolic Blood Pressure of Experimental and Control Groups (Scores in mmHg)

Group	Test	Mean	Standard Deviation	Mean Differences	‘t’ratio
Yoga Group	Pre test	135.33	9.35	8.47	5.04*
	Posttest	126.87	4.34		
Walking Group	Pre test	136.93	7.68	3.80	5.34*
	Posttest	133.13	7.17		
Control Group	Pre test	140.20	10.50	1.20	2.50*
	Posttest	141.40	9.71		

Table t-ratio at 0.05 level of confidence for 14 (df) =2.15

Table- 1 shows the mean, standard deviation and mean difference values of the pre and post test data collected from the experimental and control groups on systolic blood pressure. Further, the collected data was statistically analyzed by paired ‘t’ test to find out the significant differences if any between the pre and post data. The obtained ‘t’ values of yoga, walking practices and control groups are 5.04, 5.34 and 2.50 respectively which was greater than the required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that significant differences exist between the pre and post test means of experimental and control groups on systolic blood pressure.

Table 2: Analysis of Covariance on Systolic Blood Pressure of Experimental and Control Groups (Scores in mmHg)

Adjusted Posttest Mean			S o v	Sum of Squares	Df	Mean Squares	‘F’ ratio
Yoga Group	Walking Group	Control Group					
128.40	133.50	139.50	B	872.82	2	436.41	39.03*
			W	458.45	41	11.18	

(Table value required for significance with degrees of freedom 2 & 41 is 3.23)

\*Significant at 0.05 level of confidence

Table-2 shows that the adjusted post-test means on systolic blood pressure of yoga, walking and control groups are 128.40, 133.50 and 139.50 respectively. The obtained ‘F’ value of 39.03 on systolic blood pressure was greater than the required table value of 3.23 of 2, 42 df at 0.05 level of confidence. Hence, it was concluded that significant differences exist between the adjusted post test means yoga, walking and control groups on systolic blood pressure. Since, the obtained ‘F’ value in the adjusted post test means is found to be significant, the Scheffe’s test is applied as post hoc test to find out the paired mean difference, and it is presented in table-III

Table 3: Scheffe’s Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Systolic Blood Pressure (Scores in mmHg)

Yoga Group	Walking Group	Control Group	Mean Difference	Confidence Interval
128.40	133.50		5.10*	3.10
128.40		139.50	11.10*	3.10
	133.50	139.50	6.00*	3.10

\*Significant at 0.05 level

In table-III the Scheffe’s post hoc analysis proved that significant mean differences existed between yoga and walking groups, yoga and control groups, walking and control groups on systolic blood pressure. Since, the mean differences 5.10, 11.10 and 6.00 are higher than the confident interval value of 3.10 at 0.05 level of significance.

Hence, it is concluded that due to the effect of yoga and walking practices the systolic blood pressure of the subjects is significantly changed. It is also concluded that yoga practices is significantly better than walking practices in decreasing the systolic blood pressure.

The pre, post and adjusted post test mean values of experimental and control groups on systolic blood pressure is graphically represented in figure- I

Figure 1: Bar Diagram Showing the Mean Values on Systolic Blood Pressure of Experimental and Control Groups (Scores in mmHg)

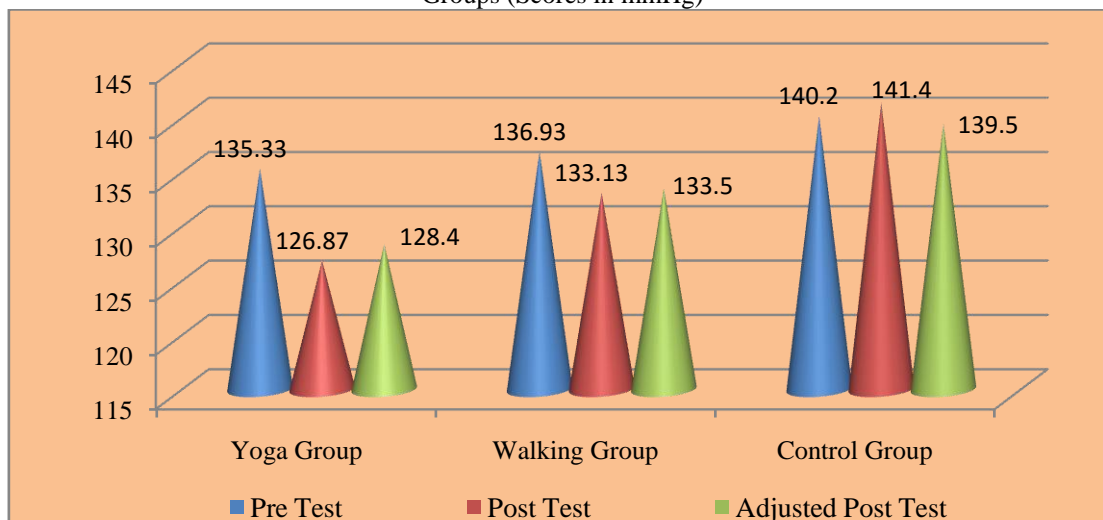


Table 4: Descriptive Analysis of the Pre and Post Test Data and ‘t’ Ratio on Diastolic Blood Pressure of Experimental and Control Groups (Scores in mmHg)

Group	Test	Mean	Standard Deviation	Mean Differences	‘t’ratio
Yoga Group	Pre test	88.07	5.47	3.07	2.99*
	Posttest	85.00	3.78		
Walking Group	Pre test	90.40	9.00	5.20	2.31*
	Posttest	85.20	5.07		
Control Group	Pre test	91.27	5.96	1.07	1.95
	Posttest	92.33	4.99		

Table t-ratio at 0.05 level of confidence for 14 (df) =2.15

In table- 4 shows the mean, standard deviation and mean difference values of the pre and post test data collected from the experimental and control groups on diastolic blood pressure. Further, the collected data was statistically analyzed by paired ‘t’ test to find out the significant differences if any between the pre and post data. The obtained ‘t’ values of yoga and walking practice groups are 2.99 and 2.31 respectively which are greater than the required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that significant differences exist between the pre and post test means of experimental groups on diastolic blood pressure.

Table 5: Analysis of Covariance on Diastolic Blood Pressure of Experimental and Control Groups (Scores in mmHg)

Adjusted Posttest Mean			S o V	Sum of Squares	Df	Mean Squares	‘F’ ratio
Yoga Group	Walking Group	Control Group					
85.58	85.05	91.90	B	429.05	2	214.53	12.50*
			W	703.92	41	17.17	

(Table value required for significance with degrees of freedom 2 & 41 is 3.23)

\*Significant at 0.05 level of confidence

Table-V shows that the adjusted post-test means on diastolic blood pressure of yoga, walking and control groups are 85.58, 85.05 and 91.90 respectively. The obtained ‘F’ value of 12.50 on diastolic blood pressure was greater than the required table value of 3.23 of 2, 42 df at 0.05 level of confidence. Hence, it was concluded that significant differences exist between the adjusted post test means of yoga, walking and control groups on diastolic blood pressure.

Since, the obtained ‘F’ value in the adjusted post test means is found to be significant, the Scheffe’s test is applied as post hoc test to find out the paired mean difference, and it is presented in table – VI

Table 6: Scheffe’s Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Diastolic Blood Pressure (Scores in mmHg)

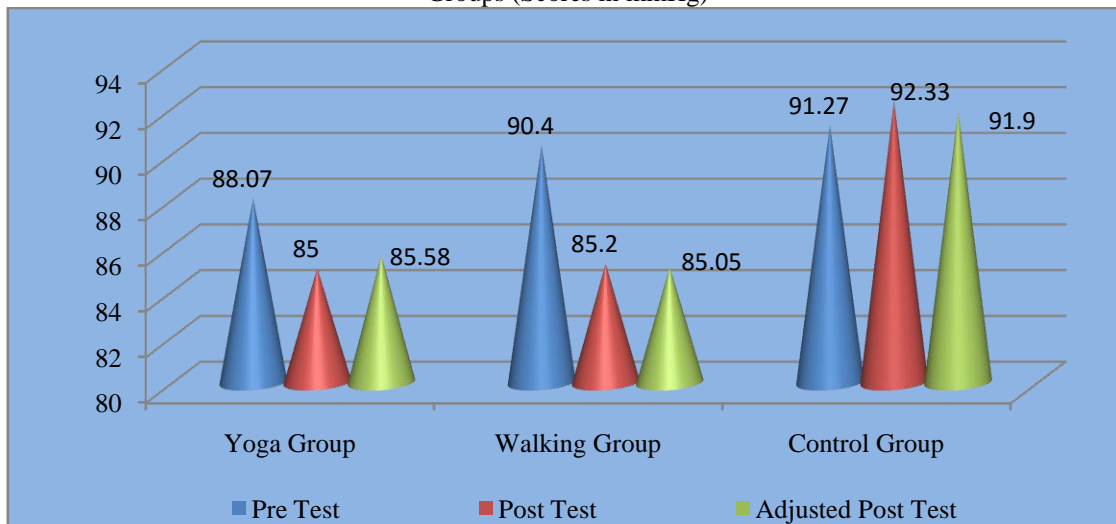
Yoga Group	Walking Group	Control Group	Mean Difference	Confidence Interval
85.58	85.05		0.53	3.85
85.58		91.90	6.32*	3.85
	85.05	91.90	6.86*	3.85

\* Significant at 0 .05 level

In table- VI the Scheffe's post hoc analysis proved that significant mean differences existed between yoga and walking groups, yoga and control groups, walking and control groups on diastolic blood pressure. Since, the mean differences 0.53, 6.32 and 6.86 are higher than the confident interval value of 1.25 at 0.05 level of significance. However, no significant mean differences existed between yoga and walking groups on diastolic blood pressure. Since, the mean differences 0.53 is higher than the confident interval value of 3.85 at 0.05 level of significance.

Hence, it is concluded that due to the effect of yoga and walking practices the diastolic blood pressure of the subjects is significantly changed. It is also concluded that no significant differences existed between yoga and walking practices in decreasing the diastolic blood pressure. The pre, post and adjusted post test mean values of experimental and control groups on diastolic blood pressure is graphically represented in figure-II

Figure 2: Bar Diagram Showing the Mean Values on Diastolic Blood Pressure of Experimental and Control Groups (Scores in mmHg)



The twelve weeks *yoga* training and brisk walking induced to exert more energy and exercise themselves along with their usual medication. As the subjects began to do the physical exertion there was increased blood circulation, which resulted in stabilization of blood pressure. With the additional aerobic power, the blood pressure began to stabilize. Hence, there was reduction in blood pressure. The findings proved that the twelve weeks of yogic and Brisk walking exercises has beneficially altered mean arterial blood pressure significantly.

#### Conclusion:

- ✓ In Systolic blood pressure, Experimental Group I (Yoga) exhibited significant decrease than Experimental Group II (Brisk walking). Hence Experimental Group I was significantly better than Experimental Group II
- ✓ In Diastolic blood pressure, Experimental Group I (Yoga) exhibited significant decrease than Experimental Group II (Brisk walking). Hence Experimental Group I was significantly better than Experimental Group II

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