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Intervention of twelve-weeks of yoga and walking programme on resting heart rate of diabetic type-2 patients

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Abstract
The purpose of the present study was to find out Intervention of Twelve-weeks of Yoga Versus Walking Programme on Resting Heart Rate of Diabetic Type-2 Patients.
Methodology: For this purpose 10 male Diabetic Type-2 Patients of Azamgarh District with age ranging from 45-55 year were selected as subject for the study. The criterion measures for the study was Resting Heart Rate which was measures by manual Method in counts.
Result: The result of the study indicates that there was significant differences exist between pre and post-test when it was measured after treatment of yoga, walking and control group on diabetic type-2 patient.

Keywords: Yoga practices, brisk walking, resting heart rate and diabetic type-2 patient

Introduction
Diabetes mellitus afflicts millions of Indians. While it was previously thought that diabetes is a disease mostly confined to Western Countries, recent studies have shown that Indians have in fact a higher chance of developing diabetes. In fact, diabetes affects approximately 10% of adult middle class urban Indians and rivals heart disease as a cause for morbidity and death.
Excess sugar in blood, Hyper Glycosuria, is found in our ancient Sanskrit texts. Indeed, at least three conditions are mentioned in Sanskrit works on Ayurveda, the Science of Vedic Health, and in manuscripts on Yoga Chikitsa. There, Diabetes Mellitus, Sugar Diabetes, is called Madhumeha. "Madhu" is the Sanskrit word for honey. Diabetes, innocens or Renal Glycosuria, (as in the Kidneys) is called Prameha in the Sanskrit, while Diabetes Insipidus, Congential Diabetes, is termed Vahu Mutraroga. The term 'Vahu' probably more correctly 'Bahuka' which literally means 'an arm' and is a synonym for an insipid condition that literally reaches out throughout the body. The term 'diabetes' is from the Greek 'Ditbainein", which means to 'cross through' as a high blood sugar literally crosses through the thresh-hold of metabolic tolerance and the excess sugar is thrown out through the urine. Polyuria or frequent passage of urine is the major characteristic of this disorder.
Diabetes Infantilise is a congenital condition and sometimes called Juvenile Diabetes. It is one of the new scourges of mankind as diabetes is on the increase worldwide. This particular form of diabetes may not completely respond to Yoga Therapy as the cells of the body have mutated through genetic changes. These changes could be bred out for a future healthy generation by taking totally to living unified Yoga Life.
These Islets secret Insulin directly into the blood stream controlling blood/sugar balance, or imbalance. thus the research scholar was interested in to find out the Intervention of twelve-weeks of yoga and walking on resting heart rate of diabetictype-2 patients.

Material and Methods
Total 30 male diabetic type-II patients of Azamgarh district with age ranging from 45 to 55 years, were selected as a subject of the study. The subjects were divided into three categories of 10 subjects in each control group (CG), yogic group (YG) and walking group (WG).

Selection of Variables
Based on available literatures, supervisory guidance and researchers own understanding, the Criterion measures for the study was Quality of life.

Collection of Data

The yogic program as well as walking program were administered on experimental groups for the period of twelve weeks while the control group did not get any kind of training program. Before the administration of yogic and walking program, the selected tests were administered on both the experimental and control groups to collect pre-test data. After the completion of twelve weeks of yogic and walking program, again the same selected tests were conducted to collect the post training data.

Experimental Design

For the study pre-test – post-test design, which consisted of experimental groups (n=10) was used.

Yogic Group (YG)	O1	T	O2
Walking Group (WG)	O1	T	O2
Control Group (CG)	O1		O2

O1 = Pre Observation, O2 = Post Observation T = Treatment

Selection of Yogic Practices

The following yogic practices were selected as per literatures and guidance of experts.

- Surya Namaskar
- Asana of standing position
  Tadasan
  Trikonasana
- Asana of sitting position
  Paschimotanasana
  Ardhmatsyendrasna
- Lying on prone position
  Salabhasan
  Dhanurasana
- Lying on supine position
  Uttanpadasan
  Pawanmuktasan
  Setubandhasan
  Naukasana
- Inverted position
  Vipritakarni
  Sarvangasana with help
- Relaxative
  Makarasana
  Shavasana
- Bandha
  Uddiyan Bandha
  Mula Bandha
  Jalandhar Bandha
- Pranayama
  Bhastrika
  Kapalbhati
  Bahya Pranayama
- Meditation
  Pranadharna

The yogic program was administered in following manners

Surya Namaskar
↓
Asana of standing position
↓
Asana of sitting position
↓
Lying on prone position
↓
Lying on supine position
↓
Inverted position
↓
Relaxative
↓
Bandha
↓
Pranayama
↓
Meditation

Table 1: Distribution of training components for Type II diabetic patients for the period of twelve weeks yoga practices and walking program

	Weeks 1st to 4th	Weeks 5rd to 8th	Weeks 9th to12th
For Yogic Group			
Duration	35 minutes	40 minutes	45 minutes
Walking Group			
Intensity	2.0 mph to 2.5mph	2.5 mph to 3.0 mph	3.0 mph to 4.0 mph
Duration	35 minutes	40 minutes	45 minutes
Volume	9.385 to 11.732 km/week	11.732 to 16.09 km/week	16.09 to 24.135 km/week

Resting Heart Rate

Objective: To measure the Resting heart rate.

Equipment: Stop Watch

Description: Before recording the resting heart rate, the subjects was instructed to remain lying on their bed. To record heart rate, the pulse rate was recorded by palpation at the radial artery minute. The tips of three fingers are placed either on the radial artery at the wrist or at a carotid artery just below the neck. The count was counted for 60 seconds or 30 seconds or 10 seconds duration and multiplies by 2 or 6. The number of beats counted was recorded as beat per minute.

Score: The score was expressed in terms of number of pulse beats per minute.

Findings of the Study

The results pertaining to analysis of co-variance between experimental groups and control group on diabetic type 2 patients for pre-test-post-test respectively have been presented in table No.2.1 to 2.5.

Table 2.1: Descriptive Statistics of Resting Heart Rate of Yoga, Walking and Control Groups in Pre-Test and Post-Test

Descriptive Statistics	Yoga Group		Walking Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
Mean	76.10	73.30	76.00	73.60	75.80	76.60
Std. Error of Mean	.767	.367	1.193	.980	.964	1.035
Std. Deviation	2.424	1.160	3.771	3.098	3.048	3.273
Minimum	72	72	72	70	72	72
Maximum	80	75	82	80	80	80
N	10	10	10	10	10	10

The table showing descriptive statistics of data indicates mean, standard error, standard deviation and sample variance along with the range showing minimum and maximum score of the subjects. The kurtosis and skewness score presented along with the standard error of kurtosis and standard error of skewness itself indicates the scientific authenticity of the data gathered.

Table 2.2: Adjusted Post Test Means of Yoga, Walking and Control Groups in relation to Resting Heart Rate

Groups	Mean	Std. Error
Yoga Group	73.229	.682
Walking Group	73.582	.682
Control Group	76.688	.682

Table 2.3: Analysis of Variance of Comparison of Means of Yoga, Walking and Control Groups in relation to Resting Heart Rate\

		Sum of Squares	*df*	Mean Square	*F*	Sig.
Pre Test	Among Groups	.467	2	.233	.024*	.976
	Within Group	264.500	27	9.796		
Post Test	Among Groups	66.600	2	33.300	4.613	.019
	Within Group	194.900	27	7.219		

*Insignificant at .05 level

F value required to be significant at 2, 27 *df* = 3.35

In relation to pre test, table 4.36 revealed that the obtained '*F*' value of 0.024 was found to be insignificant at 0.05 level, since this value was found lower than the tabulated value 3.35 at 2, 27 *df*.

In relation to post test, significant difference was found among yoga, walking and control groups pertaining to Resting Heart Rate, since *F* value of 4.613 was found significant at .05 level.

Table 2.4: Analysis of Covariance of Comparison of Adjusted Post Test Means of Yoga, Walking and Control Groups in relation to Resting Heart Rate

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Contrast	72.323	2	36.161	7.776*	.002
Error	120.904	26	4.650		

*Significant at .05 level

F value required to be significant at 2, 26 *df* = 3.37

Table 4.37 revealed that the obtained '*F*' value of 7.776 was found to be significant at 0.05 level, since this value was found higher than the tabulated value 3.37 at 2, 26 *df*.

Since the *F*-value was found to be significant, the Least Significant Difference (L.S.D.) Post Hoc Test was applied for inter-group comparison.

Table 2.5: Least Significant Difference (L.S.D.) Post Hoc Test for Comparison of the Adjusted Post Test Means of All Groups in relation to Resting Heart Rate

(I) Groups	(J) Groups	Mean Difference (I-J)	CD
Yoga Group	Walking Group	-.353	1.982735
	Control Group	-3.459*	
Walking Group	Control Group	-3.106*	

*Significant at .05 level

Table 4.38 revealed that significant difference was found between yoga group and control group; walking group and control group. On the other hand insignificant difference was found between yoga group and walking group.

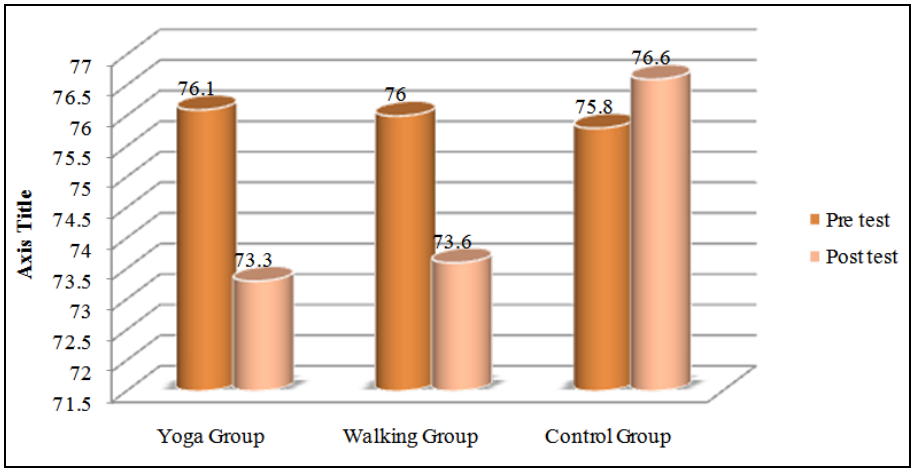

Fig 1: Graphical representation of the comparison of mean of yoga, walking and control groups in relation to resting heart rate

Successful accomplishment of this study was a result of very exhaustive deliberation, discussion critical reviews of literature frequent and several experimentation and finally compliance of various systematic methodologies in administrating of treatment of programmes. Findings of the study not only provided understanding about the experimental effects but also methodology to conduct of such studies. Based on all above findings from statistical analysis, scholars own inferential ability and within the constraints and limitations of the study following conclusions were drawn.

- Walking is beneficial for diabetic type 2 patients in controlling associated risk factors of diabetes i.e. Body mass index, central obesity, and west hip ratio.
- Yogic practice is beneficial for diabetic type 2 patients in controlling associated risk factors of diabetes i.e. resting heart rate, and blood pressure.
- It is also concluded that in case of psychosomatic entities, yogic practices were found beneficial whereas walking was found beneficial for physical entities.

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