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Impact of swimming & yogic exercise on random blood sugar level among diabetic patients

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Abstract

The aim of the study was designed to find out the impact of swimming & yogic exercise on random blood sugar level among diabetic patients. To attain the purpose, sixty (N=60) men diabetic patients residing in Belagavi, Karnataka, India were randomly selected as subjects. They were divided randomly into four groups of fifteen each i.e., (n=15) Group-I underwent Swimming, Group-II underwent Yogic Exercises, Group-III underwent Combined swimming and yogic exercise and Group-IV was act as Control. The Experimental groups underwent respective training period for three days per week for twelve weeks. For Combined swimming and yogic exercise the training period was restricted to twelve alternative weeks and the number of sessions per week was also confined to three. Random Blood Sugar was selected as dependent variable and it was assessed through Blood Samples. All the subjects were tested prior to and immediately after the experimental period on the selected dependent variables. Data were collected and statistically analyzed using ANCOVA. Scheffe's post hoc test was applied to determine the significant difference between the paired means. In all the cases 0.05 level of significance was fixed. The results of the study showed that there was a significant difference among all the Experimental groups' namely swimming group, yogic exercises group and combined swimming and yogic exercise group. Further the results, showed combined swimming and yogic exercise group was found to be better than the swimming and yogic exercise group in Random Blood Sugar.

Keywords: Swimming, yogic exercise, combined swimming and yogic exercise, random blood sugar

Introduction

Swimming is an aquatic sport which is based on the human act of swimming. Basically, the goal of swimming sport is to complete a given distance in the smallest time. Different swimming competitions are held which are totally based on speed and endurance such as crossing an English Channel. Swimming as a sport, is different from other aquatic sports like diving, synchronized swimming and water polo that involves the act of swimming but the goal is neither speed nor endurance. However, it is widely believe that swimming is the best aerobic exercise in the world.

Swimming affords a variety of health benefits to its participants, including improved mental health and a reduction of chronic disease. Swimming improves mood and decreases the symptoms of depression. In addition, swimmers reduce their death rate by one-half, compared with those who are inactive. For older individuals, swimming improves health among post-menopausal women and decreases disability among both men and women. For those with preexisting injuries, the buoyancy of the water provides a low-impact and pain-free form of exercise (Belza *et al.*, 2002) [2].

The Sanskrit word yoga has the literal meaning of "yoke", or "the act of yoking or harnessing", from the root word Yuj. In Vedic Sanskrit, the term "yoga" besides its literal meaning, the yoking or harnessing of oxen or horses, already has a figurative sense, where it takes the general meaning of "employment, use, application, performance" (compare the figurative uses of "to harness" as in "to put something to some use"). All further developments of the sense of this word are post-Vedic. A sense of "exertion, endeavor, zeal, diligence" is found in Epic Sanskrit. The more technical sense of the term "yoga", describing a system of meditation or contemplation with the aim of the cessation of mental activity and the attaining of a "supreme state" arises with early Buddhism (5th century BC), and is adopted in Vedanta philosophy by the 4th century BC (Barbara, 1996) [1].

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There are a great many compounds containing yoga in Sanskrit, many of them are unrelated to the technical or spiritual sense. Yoga in these words takes meanings such as "union, connection, contact", or "method, application, performance", etc. For example, guna-yoga means "contact with a cord"; cakra-yoga has a medical sense of "applying a splint or similar instrument by means of pulleys (in case of dislocation of the thigh)"; candra-yoga has the astronomical sense of "conjunction of the moon with a constellation"; pum-yoga is a grammatical term expressing "connection or relation with a man", etc. (Wynne, 2007) [3].

Methodology

The study was conducted on sixty (N=60) men diabetic patients residing in Belagavi, Karnataka, India were randomly selected as subjects. They were divided randomly into four groups of fifteen each i.e., (n=15) Group-I underwent Swimming, Group-II underwent Yogic Exercises, Group-III underwent Combined swimming and yogic exercise and Group-IV was act as Control. The Experimental groups underwent respective training period for three days per week for twelve weeks. For Combined swimming and yogic exercise the training period was restricted to twelve

alternative weeks and the number of sessions per week was also confined to three. Random Blood Sugar was selected as dependent variable and it was assessed through Blood Samples.

Analysis of the Data

The data collected from the experimental groups and control group on prior and after experimentation on selected variables were statistically examined by analysis of covariance (ANCOVA) was used to determine differences, if any among the adjusted post test means on selected criterion variables separately. Whenever they obtained f-ratio value was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases 0.05 level of significance was fixed.

Random blood sugar

The analysis of dependent 't'-test on the data obtained Random Blood Sugar of the subjects in the Pre-test and Post-test of Swimming group, Yogic Exercises group, Combined swimming and yogic exercise group and Control group have been presented in Table-1.

Table 1: The Summary of Mean and Dependent 'T' Test for the Pre and Post Tests on Random Blood Sugar of Experimental Groups and Control Group

Mean	Swimming Group	Yogic Exercises Group	Combined Swimming and Yogic Exercises Group	Control Group
Pre-test mean	183.21	183.25	181.19	180.47
Post-test mean	169.11	168.15	156.22	180.67
't'-test	9.22*	6.89*	11.43*	0.16

* Significant at 0.05 level.

(Table value required for significance at .05 level for 't'-test with df 14 is 2.15)

Table -1 show that the pre-test mean on Random Blood Sugar of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group are 183.21, 183.25, 181.19 and 180.47 respectively. The post-test mean are 169.11, 168.15, 156.22 and 180.67 respectively. The obtained dependent t-ratio values between the pre and post test means on Random Blood Sugar of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group are 9.22, 6.89, 11.43 and 0.16 respectively.

The table value required for significant difference with df 14 at 0.05 level is 2.15. It was concluded that Experimental groups such as swimming group, Yogic Exercises group, combined swimming and yogic exercise group had registered significant improvement in Random Blood Sugar.

The results of the Analysis of Covariance on Random Blood Sugar of the pre, post, and adjusted test scores of Swimming group, Yogic Exercises group, Combined swimming and yogic exercise group and Control group are presented in Table -2.

Table 2: Analysis of covariance on random blood sugar of experimental groups and control group

Test	Swimming Group	Yogic Exercises Group	Combined Swimming and Yogic Exercises Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F ratio
Pre Test Mean	183.21	183.25	181.19	180.47	Between	134.22	3	44.74	1.45
					Within	1728.03	56	30.86	
Post Test Mean	169.11	168.15	156.22	180.67	Between	4527.11	3	1509.04	25.32*
					Within	3337.13	56	59.59	
Adjusted Post Test Mean	168.99	168.24	156.02	180.72	Between	5127.11	3	1709.04	44.14*
					Within	2129.51	55	38.72	

* Significant at 0.05 level of confidence (Random Blood Sugar Scores in mg/dL)

Table value for df (3, 56) at 0.05 level = 2.76 Table value for df (3, 55) at 0.05 level = 2.78

The above table-2 shows that the pre-test mean values on Random Blood Sugar of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group are 183.21, 183.25, 181.19 and 180.47 respectively. The obtained 'F' ratio of 1.45 for pre-test scores was lesser than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Random Blood Sugar. The post test mean values on Random Blood Sugar of Swimming group, Yogic Exercises

group, combined swimming and yogic exercise group and Control group are 169.11, 168.15, 156.22 and 180.67 respectively. The obtained 'F' ratio of 25.32 for post-test scores was higher than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Random Blood Sugar.

The adjusted post-test means on Random Blood Sugar of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group are

168.99, 168.24, 156.02 and 180.72 respectively. The obtained 'F' ratio of 44.14 for adjusted post-test scores was higher than the table value of 2.78 for degrees of freedom 3 and 55 required for significance at 0.05 level of confidence on Random Blood Sugar.

The results of the study indicate that there are significant differences among the adjusted post test means of Swimming

group, Yogic Exercises group, combined swimming and yogic exercise group and Control group in Random Blood Sugar.

To determine which of the paired means have a significant difference, the Scheffe's test is applied as Post hoc test and the results are presented in Table -3.

Table 3: The Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Random Blood Sugar

Adjusted Post-test Means				Mean Difference	Confidence Interval
Swimming Group	Yogic Exercises Group	Combined Swimming and Yogic Exercises Group	Control Group		
168.99	168.24			0.75	6.12
168.99		156.22		12.77*	6.12
168.99			180.67	11.68*	6.12
	168.24	156.22		12.02*	6.12
	168.24		180.67	12.43*	6.12
		156.22	180.67	24.45*	6.12

* Significant at 0.05 level of confidence

Table-3 shows that the adjusted post test mean differences on Random Blood Sugar between swimming group and combined swimming and yogic exercise group, swimming group and control group, yogic exercises group and combined swimming and yogic exercise group, yogic exercises group and control group and combined swimming and yogic exercise group & control group are 12.77, 11.68, 12.02, 12.43 and 24.45 respectively, which are greater than the confidence interval value of 6.12 on Random Blood Sugar at 0.05 level of confidence.

Further the table-3 shows that the adjusted post tests mean differences on Random Blood Sugar between swimming group and yogic exercises group is 0.75. This is lesser than the confidence interval value of 6.12 on Random Blood Sugar at 0.05 level of confidence.

The results of the study showed that there was a significant difference between swimming group and combined swimming and yogic exercise group, swimming group and control group, yogic exercises group and combined swimming

and yogic exercise group, yogic exercises group and control group and combined swimming and yogic exercise group & control group on Random Blood Sugar. Further the results of the study showed that there was no significant difference between swimming group and yogic exercises group on Random Blood Sugar.

The above data also reveal that combined swimming and yogic exercise group had shown better performance than swimming group and yogic exercise group and control group in Random Blood Sugar.

The pre and post mean values of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group on Random Blood Sugar are graphically represented in the Figure -1.

The adjusted post mean values of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group on Random Blood Sugar are graphically represented in the Figure -2.

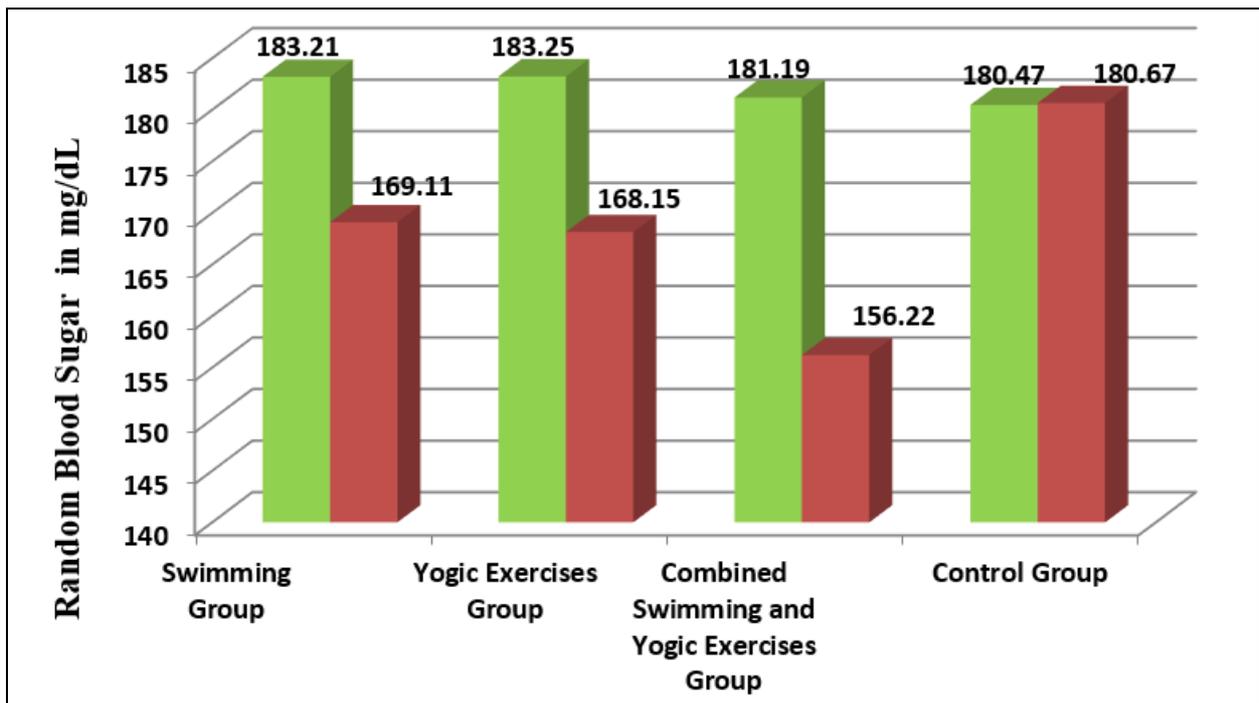


Fig 1: The Pre and Post test Mean values of Swimming group, Yogic Exercises group, combined swimming and yogic exercise group and Control group on Random Blood Sugar

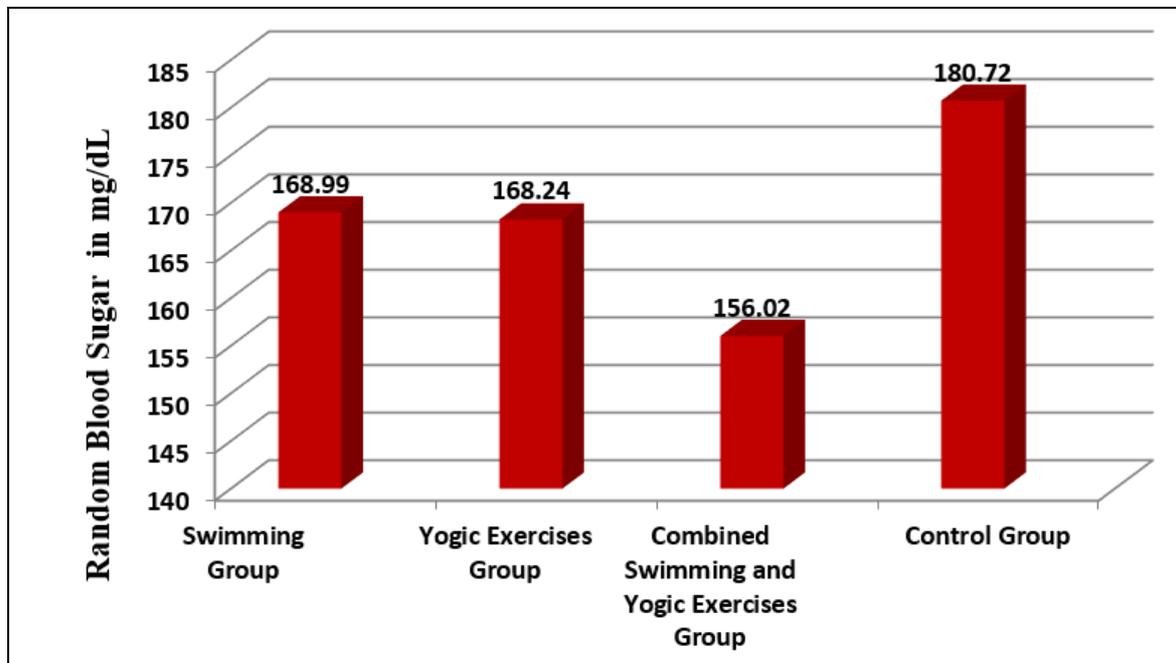


Fig 2: The adjusted post mean values of swimming group, yogic exercises group, combined swimming and yogic exercise group and control group on random blood sugar

Conclusion

From the analysis of the data, the following conclusions were drawn.

1. Significant differences in achievement were found between Swimming group, Yogic Exercises group, combined swimming and yogic exercises group and Control group in the selected criterion variable on Random Blood Sugar.
2. The Experimental groups namely, Swimming group, Yogic Exercises group, combined swimming and yogic exercises group had significantly decreased in Random Blood Sugar.
3. The combined swimming and yogic exercises group was found to be better than the Swimming group, Yogic Exercises group, and Control group in decreasing Random Blood Sugar.

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