Effect of 8-Weeks Yogic Practices on the Hematological Variables and Lipid Profile of Sportsmen

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Abstract

Objectives: The purpose of this investigation was to study the effect of 8-week Yogic practices on hematological variables and lipid profile of university level sports persons. **Methods:** Pretest and posttest design was used. Experimental group (N = 10) allowed to undergo yogic practices for 8 weeks (six days a week), while control group (N = 10) maintained their daily routine activities. The selected Hematological variables that is White Blood Cells and Red Blood Cells and Lipid profile that is High Density Lipoprotein and Low Density Lipoprotein were examined by laboratory tests. For the analysis of data paired 't' test was applied. **Findings:** There was insignificant reduction of white blood cells in experimental group [pretest value (8.69 x 10^{9} /L) and posttest value (8.66 x 10^{9} /L)], but the numbers of red blood cells has significantly improved in experimental group [pretest value (4.46 x 10^{12} /L) and posttest value (4.59×10^{12} /L)] after 8 week yogic training (P<0.05). With the yogic practices high density lipoprotein has also significantly improved in experimental group [pretest value (55.40 mg/dl)] at (P<0.05). The low density lipoprotein has shown significant decrease in experimental group [pretest value (98.50 mg/dl)] and posttest value (89.30 mg/dl)] after 8 week yogic training (P<0.05). From the results, it can be predicted that, yoga practice is a cost-effective method which can be helpful to improve performance in sportsperson, especially in endurance sports. **Conclusion:** These results demonstrate that yogic practices enhance the Red blood cells and high density lipoprotein level and help to decrease the low density lipoprotein level among the sportsmen.

Keywords: High Density Lipoprotein, Low Density Lipoprotein, Red Blood Cells, Sportsmen, White Blood Cells, Yogic Practices

1. Introduction

The spirit for winning medals in the prestigious international competitions has stimulated the sports scientist to take initiative to explore all the aspects and possibilities which can be helpful to improve sports performance. The standard of Sports performance has risen to a great height with the direct help taken from various sports sciences such as sports physiology, sports medicine, biomechanics, sports psychology and sports training etc. Several techniques of sports training were used to enhance performance. The sports scientists have now started looking beyond these horizons and yogic techniques are also used nowadays to enhance the performance of sports person.

Yoga is the "Union of the individual self with the universal self". The word yoga means "to unite" or "union" or "to combine" or "to join" development of the personality of a human being physical, mental, moral, intellectual and spiritual¹. Continuous practice of yogic exercises helps our body to remain fit by controlling body weight.

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Regular exercise results in an increase in the blood flow and improves oxygen carrying and waste removal capacity and further increases work load capacity².

For sports person, yoga with regular training exercises can be a used as a powerful tool for enhancement in performance. With the routine training program, yoga helps to develop strength, flexibility, balance, coordination, mental concentration and reduced stress. With the addition of yoga in training program, the most important benefit is to allow an athlete to do movement with greater range of motion and enhanced the muscular economy with reducing the chance of injury³.

In an early work, we have found that high density lipoprotein-cholesterol was increased in men with Pranayama, while triglycerides and Low density lipoprotein-cholesterol decreased in women after yoga asanas⁴. In the similar study, we also observed that yoga training showed a regular decrease in all lipid parameters except high density lipoprotein^{5, 6}. A study done by⁷ to know the effects of Pranayama and Yogasana on lipid profile of 20 male healthy footballers, They have found significant decrease in the levels of serum cholesterol, Low-density lipoprotein-cholesterol, serum triglycerides, and verylow-density lipoprotein-cholesterol.

Beside the studies reporting that there have been positive developments in the biochemistry of blood as a result of acute exercise^{8, 9}, there are also studies stating that there have been improvements as a results of not acute but long term exercises^{10, 11}. Moreover, it has been determined with the studies that in order to know the effects of yogic exercises on the lipoproteins, at least 5-week regular exercise is required to have positive effects on the lipid metabolism¹². Studies by¹³⁻¹⁶ found that total cholesterol, LDL, secrum triglyceride can be managed in the body with the help of yogic life style intervention. The present day research in the field of physical education and sports has recommended that the yogic exercise have very positive effects on the physical and physiological variables of layman. Therefore current investigation was focused to find out the effects of yogic practices on lipid profile and selected hematological variables of sports men.

2. Method and Procedure

2.1 Selection of Subjects and Variable

To achieve the aim of the present investigation, twenty male sports person between the age group of 18-25 years from

Lovely Professional University were selected as subjects, who had participated at least in the inter university level competition. The subjects were randomly divided into two groups as experimental group (N1 = 10) and control group (N2 = 10). The objectives and protocol of the study were informed to all the subjects. After consultation with the experts, availability of tools and adequacy to the students, the following variables were selected for the present study:

2.1.1 Hematological Variables

- White Blood Cell (W.B.C).
- Red Blood Cell (R.B.C).

2.1.2 Lipid Profile

- High Density Lipoprotein (HDL).
- Low Density Lipoprotein (LDL).

2.2 Design of the Study

For the collection and analysis of data, pre test-post test design was used. After taking consent from the subjects to act as the sample of the study, one week familiarization camp was organized. The selected subjects (N = 20) were divided equally and randomly into two groups, out of which group I act as an experimental group and underwent yogic training, and group II acted as control group. The experimental group had given training of yogic exercises in the morning between 7.00 A.M. to 9.00 A.M. for six days in a week and Sunday was kept for the rest. Apart from training, daily routine classes were also attended by the subjects. Data of Pre-test and post-test were collected under the supervision of expert.

2.3 Experimental Training Program

The training program of 8-weeks for yogic practice was developed. Warm up and limbering down had done before and after the training program. The yogic training program was given to experimental group for 8 weeks of one session in the morning between 7.00 A.M. to 9.00 A.M. for six days in a week. The training program consist of different types of yogic activities which are mentioned below in Table 1.

2.4 Statistical Analysis

Paired 't'-test was applied to analyze the Pre-Post test differences. The level of significance was set at 0.05 levels (p<0.05).

3. Results

Table 2 exhibits the results of experimental group and the control group in a tabular figure for the variable 'White Blood Cells'. In case of experimental group, statistical deduction stated that the values of mean and standard deviation for the variable 'White Blood Cells' was 8.69 \pm 0.17 (pre-test) and 8.66 \pm .17 (post-test). Whereas for control group the pre-test and post-test values were 8.65 \pm .15 and 8.64 \pm .16, respectively. While testing the difference of mean between the pre test and post test of experimental group the t-value for WBC came out to be 1.41 and for the control group it lies at 1.0, which was insignificant at .05 level of significance. Hence, it may be interpreted that WBC of experimental group has slightly decreased after 8-weeks yogic training. The graphical representation of mean values of experimental

Table 1.Training program of yogic exercises

Sl. No.	Yogic exercises	Repetition	Set
1	Suryanamaskar (12 Count)	4	1
2	Kapal Bhati	300	2
3	Bastrika pranayam	10	5
4	Om Chanting	10	3
5	Savasan	25	1
6	Tadasana,	5	1
7	Halasana,	5	1
8	Mandukasana	5	1

and control group for white blood cells are presented in Figure 1.

Table 3 exhibits the results of experimental group and the control group in a tabular figure for the variable 'Red Blood Cells'. In case of experimental group, statistical deduction stated that the values of mean and standard deviation for the variable 'Red Blood Cells' was $4.46 \pm .04$ (pre-test) and $4.59 \pm .08$ (post-test). Whereas for control group the pre-test and post-test values were $4.46 \pm .01$ and $4.47 \pm .01$, respectively. While testing the difference of mean between the pre test and post test of experimental group the t-value for RBC came out to be 4.20, which was significant at 0.05 level and for the control group it lies at 1.0, which was insignificant at .05 level of significance.



Figure 1. Pre test and post test mean values of experimental and control group on variable white blood cells.

Table 2. Significance of differences between pre-test and post-test means ofexperimental group and the control group with regard to white blood cells

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		Mean	SD	SEM	t-value
Experimental Group	Pre-Test	8.69 x 10 ⁹ /L	0.17	0.05	1.41
	Post Test	8.66 x 10 ⁹ /L	0.17	0.05	
Control Group	Pre-Test	8.65 x 10 ⁹ /L	0.15	0.05	.55
	Post Test	8.64 x 10 ⁹ /L	0.16	0.05	

* Significant value at 0.05 level=2.26

Table 3. Significance of differences between pre-test and post-test means ofexperimental group and the control group with regard to red blood cells

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		Mean	SD	SEM	t-value
Experimental Group	Pre-Test	4.46 x 10 ¹² /L	0.04	0.01	4.20*
	Post Test	$4.59 \ge 10^{12}/L$	0.08	0.02	
Control Group	Pre-Test	4.46 x 10 ¹² /L	0.01	0.003	1.0
	Post Test	4.47 x 10 ¹² /L	0.01	0.003	

* Significant value at 0.05 level=2.26

Hence, it may be interpreted that RBC of experimental group has significantly improved after 8-weeks yogic training. The graphical representation of mean values of experimental and control group for red blood cells are presented in Figure 2.

Table 4 exhibits the results of experimental group and the control group in a tabular figure for the variable 'High Density Lipoprotein'. In case of experimental group, statistical deduction stated that the values of mean and standard deviation for the variable 'High Density Lipoprotein' was $37.0 \pm .94$ (pre-test) and 46.10 ± 1.45 (post-test). Whereas for control group the pre-test and post-test values were $36.9 \pm .74$ and $37.2 \pm .78$, respectively. While testing the difference of mean between the pre test and post test of experimental group the t-value for HDL came out to be 17.30, which was significant at 0.05 level and for the control group it lies at 1.41, which was insignificant at .05 level of significance. Hence, it may be interpreted that HDL of experimental group has significantly improved after 8-weeks yogic training. The graphical representation of mean values of experimental and control group for high density lipoprotein is presented in Figure 3.



Figure 2. Pre test and post test mean values of experimental and control group on variable red blood cells.

Table 5 exhibits the results of experimental group and the control group in a tabular figure for the variable 'Low Density Lipoprotein'. In case of experimental group, statistical deduction stated that the values of mean and standard deviation for the variable 'Low Density Lipoprotein' was $98.50 \pm .97$ (pre-test) and 89.30 ± 1.07 (post-test). Whereas for control group the pre-test and post-test values were 99.60 \pm .5 and 99.50 \pm .53, respectively. While testing the difference of mean between the pre test and post test of experimental group the t-value for LDL came out to be 8.74, which was significant at 0.05 level and for the control group it lies at .42, which was insignificant at .05 level of significance. Hence, it may be interpreted that LDL of experimental group has significantly lowered after 8-weeks yogic training. The graphical representation of mean values of experimental and control group for high density lipoprotein is presented in Figure 4.

4. Discussion

It is evident from mean values of both groups in Table 2 that there is decrease in total white blood cells. Yogic



Figure 3. Pre test and post test mean values of experimental and control group on variable HDL.

Table 4.	Significance of differences between pre-test and post-test
means of	experimental group and the control group with regard to High
Density L	ipoprotein

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		Mean (mg/dl)	SD	SEM	t-value
Experimental Group	Pre-Test	37.00	.94	0.29	17.30*
	Post Test	55.40	1.26	0.40	
Control Group	Pre-Test	36.9	0.74	0.23	1.41
	Post Test	37.2	0.78	.25	

* Significant value at 0.05 level=2.26

		Mean (mg/dl)	SD	SEM	t-value
Experimental Group	Pre-Test	98.50	.97	.31	8.74*
	Post Test	89.30	3.40	1.07	
Control Group	Pre-Test	99.6	.52	.163	0.42
	Post Test	99.5	.53	.166	

Table 5.Significance of differences between pre-test and post-test meansof experimental group and the control group with regard to Low DensityLipoprotein

* Significant value at 0.05 level=2.26



Figure 4. Pre test and post test mean values of experimental and control group on variable LDL.

asanas minimizes all types of stress whether it is physical, physiological or psychological as revealed by decreased leukocyte count after yoga¹⁷. Decline in total WBC count may be due to the concept that hypoxia induced during yoga, increase erythroied series in bone marrow causes relative decrease in WBC count or Yoga may transited the WBC in their resting condition and decrease various cytokines which are responsible for leucopoiesis¹⁸. The above results might be due to shorter span of training period and the difficulties in training the white blood cells through yogic practices.

It has been observed from the mean values of both groups in Tables 3 that there is significant improvement of red blood cells in case of experimental group only. We had performed comprehensive literature search on effect of yoga on red blood cell count¹⁹, which supported our findings in this study.

A perusal at findings of Table 4, it has been observed that there is a significant improvement in the level of High Density Lipoprotein in case of experimental group only. The review showed that yoga practice had beneficial effects on HDL cholesterol level²⁰.

While analyzing the mean values of both the groups from the Table 5, it has been observed that there is a significant lowering in the level of Low Density Lipoprotein in case of experimental group only²¹. Had also found that the yoga training had found to be beneficial in enhancing the Red blood cells and HDL level in the blood of rural background sports men. It has also positive effect on reducing the level of L.D.L. Thus if polluted correctly and scientifically examined, yoga can be promising investigation in improving the pathology of definite conditions among sportsmen. The selected lipid profiles and hematological variables play an important role to enhance the performance of sportsmen.

5. Conclusion

Considering the limitations and results of this study, it was concluded that experimental group has shown decrease in total WBC counts. However the decline in WBC is insignificant. It was observed that yoga training was found to be significantly beneficial in enhancing the Red blood cells and HDL level and lowering the level of LDL in the blood of sports men.

6. Acknowledgement

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