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Effect of morning exercise on immunity

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Abstract

The purpose of present study was to swot the effect of morning exercise on immunity system. Constituents of blood adapt various metabolic changes through low aerobic morning exercises. White blood cells (WBC) are the part of immune system which involved in shielding against pathological conditions. Specifically Neutrophils counts (NC) also contribute to immune system by working of phagocytes activity. Neutrophils releases cytokines which attracts and activates the anti-inflammatory as well as releases O₂ free radicals. Macrophages enters the damages remove the cellular debris and promote growth and repair of damaged cell.

The purpose of this study was to investigate about influence of morning exercise on TLC and NC. For this purpose 14 cricket players of age 18-24 years (20.64 ± 0.92 years) were selected randomly from Laksmibai national institute of physical education, Gwalior (M.P). The subjects were allocated into two groups: Group-A: Experimental (N1=7) and Group-B: Control (N2=7).

The experimental group was under four week's aerobic training program. Pre-aerobic training blood test and post-aerobic training blood test was conducted on both the groups to determine blood count (TLC) and (NC) The Paired T-Test was employed for analyzing whether the post treatment response is better than the pretreatment response in both the groups. Where obtained t-value for experimental group is (3.36, 4.68) is significant as the p-value is (0.016, 0.03) which is less than 0.05, ($p < 0.05$) TLC and NC significantly improved in experimental group. Where obtained t-value for control group is (0.44, 0.90) is insignificant as the p-value is (0.67, 0.39) which is greter than 0.05, ($p > 0.05$) TLC and NC remain insignificantly changed in control group. Through analyzing above data it can be concluded that four week aerobic training program is helpful for the positive change in total leucocytes counts and neutrophils counts in human blood. Increased leucocytes and neutrophils counts chiefly contribute in immroving immunity system.

Keywords: Morning exercise, immunity, total leucocytes counts, neutrophils counts

Introduction

An early morning workout offers numerous benefits, both to your health and to your daily schedule. As per cardiologists and sports science specialists, physical activity can increment cardiovascular productivity through expanding the working capability of lungs and heart that prompts the lessening of circulatory strain, improved immunity and destructive quick in the blood. These days open exercise, particularly morning exercise running, cycling, swimming and working out, is mainstream among various gatherings of individuals because of its straightforwardness and accommodation.³ Some benefits of exercising early in the morning are as follows:-

1. Morning Workouts Enhance Your Metabolism and immune system.
2. Morning Exercise Improves Your Physical and Mental Energy.
3. Early Morning Workouts Help You Develop Strong Self-Discipline.
4. A Morning Exercise Routine Will Help You Get Better Sleep.
5. Morning Exercise Allows You to Reach Your Fitness Goals Faster.

Due to the popularity of morning exercise, it is important to do some research on whether it is beneficial or not for immunity. Therefore investigating the effects of morning exercise is of vital importance.

Akbar Sazvar *et al* (2012)^[1] considered the impact of morning vigorous exercise on some hematological parameters in youthful, dynamic guys. 26 male (age-19 to 23 year), college understudies with no past smoking encounters or consistent exercise programs were haphazardly chosen and isolated into two gatherings: control and exercise.

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The discoveries demonstrated that amid an six week morning exercise the quantity of red platelets and hemoglobin levels expanded. While the draining circumstances and the quantity of platelets diminished altogether. In the present investigation analyst rolled out an endeavor to watch improvements actuated by six week vigorous preparing program in hematological parameters of understudies at higher optional school level.

Blood is a fluid connective tissue which consist of elements (erythrocytes/rbc, leucocytes/wbc, and platelets) in blood plasma. The cellular components of blood often more related to training and physiological changes. RBC (erythrocytes) plays omnipotent role as they transport oxygen & nutrients to hypoxic muscles while WBC (leukocytes) works as ambulance for the injured tissue while training & also called

front line defense mechanism of body.

WBC (leukocytes) consist of neutrophils which helps to fight infection by ingesting microorganisms and releasing enzymes that kill the microorganisms clears the cellular debris for muscle growth and repair. Neutrophil have an regular diameter of 12–15 micrometers (μm). Life span 1-2 days. (55-60% of blood.

“When you exercise, elevations in the activity of your white blood cells may allow your body to identify disease-causing organisms more quickly than they would under normal circumstances” According to Medline Plus.

Selection of Variables

The following hematological variables were selected for the purpose of this research and are presented in the table 1.

Table 1: Hematological Parameters.

S. No	Hematological variable	Tests For Measurement
1.	W.B.C (White Blood Cell)/ Leucocytes counts	CBC (Complete blood count)
2.	Neutrophils count	CBC (Complete blood count)

Material & Methods

For achieving the purpose of the study data was collected on fourteen male students between age group of 18- 24 years (20.64 ± 0.92 years) from Laksmibai National Institute of Physical Education, Gwalior. The subjects were allocated into two groups: Group-A: Experimental (N1=7) and Group-B: Control (N2=7).

Procedure of blood testing

Before and after training, the Total leucocytes counts and neutrophils count was measured. Blood sample was taken by the lab technician. Blood were taken by intravenous injection via radial vein. Total Leukocytes counts and neutrophils counts were measured under compound microscope & sismex xp 100(cell counter).

Schedule of four - week aerobic training program

The experimental group was subjected to a aerobic training program, consisting of five days per week morning session for the period of four - weeks. A combination of five exercise namely, Free style swimming, aerobic dance, cycling, cross-country (5km) and walking (5km) were used in this training programme.

Statistical Procedure

After the accumulation of significant data, to know the effect of aerobic training program on total leucocytes count and neutrophils count t-test was utilized on mean estimations of pre and post-tests with the assistance of SPSS 20.0. The level of significance was set at 0.05 percent.

Results

Table 2: Comparison of Mean, SD and t-value for Pre and Post-test of total leucocytes count and neutrophils count in control group

Hematological Variable	Group	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	T-value	Sig(2-tailed)
Total leucocytes counts	Control	6400	6370	522.81	586.48	0.44	0.673
Neutrophils counts	Control	4830.42	4852.28	1337.752	1320	0.90	0.399

The table no:-2 statistically reveals that the calculated p-value(level of significance) 0.673 for total leucocytes counts and 0.399 for neutrophils count is greater than 0.05 and it

could be confirmed that control group total leucocytes counts and neutrophils count doesn't increase significantly.

Table 3: Comparison of Mean, SD and t-value for Pre and Post-test of total leucocytes count and neutrophils count in experimental group.

Hematological Variable	Group	Pre-test Mean	Post-test Mean	Pre-test SD	Post-test SD	T-value	Sig(2-tailed)
Total leucocytes counts	Experimental	6842.85	7771.4286	660.44	579.40	3.36	0.016
Neutrophils counts	Experimental	4670.142	5696.86	825.78	796.82	4.68	0.03

The table no:-3 statistically reveals that the calculated p-value(level of significance) 0.016 for total leucocytes counts and 0.03 for neutrophils count is less than 0.05 and it could be confirmed that experimental group total leucocytes counts and neutrophils count does increase significantly.

Discussion on result

Through four weeks aerobic training program the Total leucocytes counts and Neutrophils counts improved significantly in experimental group but in the control group there was no significant alteration in mean values. During aerobic training the subject went under metabolic changes that

contributed the white blood cell to adapt the continuous disturbed homeostasis through increasing immunity with the help of increasing total leucocytes counts and neutrophils. White blood cell work as an ambulance through which anti-inflammatory situations are tackled. Neutrophils releases cytokines which attract and activates anti-inflammatory enzymes and also releases O_2 free radicals. Neutrophils works as phagocytes which thereby clears the damaged surface and permote the various protein for the growth and does improve immunity.

Conclusions

At the end it can be concluded that four week aerobic training program is helpful for the positive change in total leucocytes counts and neutrophils counts in human blood. Increased leucocytes and neutrophils counts chiefly contribute in improving immunity system.

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