Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
March 2024 5(3), 586–590

ACUTE EFFECT OF CONTINUOUS RUNNING ON WHITE BLOOD CELL (WBC) AMONG PHYSICALLY TRAINED BOYS

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DOI
10.29121/shodhkosh.v5.i3.2024.2571

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Introduction:
In this research, the examination of the acute effect of continuous running on the white blood cell status of physically trained boys has been aimed.
Methods:
Ten (10) physical education male students with an average age of 23.16±1.85 years participated in this study voluntarily. The white blood cell status (WBC) of the students was analyzed before running (BR) and just after 35 minutes of continuous running (AR). To determine White blood cell status (WBC), blood samples with 5 ml EDTA were taken from the forearm ante-cubical area before and after resistance exercise, and analyzed in the laboratory using an auto-analyzer (Sysmex XP- 100).
Result:
Measurement results were presented as average and standard deviation. Student T-test for dependant samples was used to make a comparison between BR and AR values. P<-0.01 value was considered to be significant. The result of the study revealed that, the increase in AR than BR values for White blood cell status (WBC) was significant.
Conclusion:
Conclusively White blood cell status (WBC) displayed significant incensement in relation to acute continuous running.

Keywords: WBC, Blood, Continuous Running, Acute effect

1. INTRODUCTION

In scientific exercise, total leukocyte counts and subsets are widely used to verify inflammatory method-related acute immune system disturbances (Mochizuki et al., 2012) which have been associated with the improvement of several conditions harmful to health. (Manabe I.2011) However, a complex interplay among manifold genetic and environmental factors determines interpersonal variability in leukocytes. (Mahaney MC et al. 2005) A high interpersonal variation in white blood cell (WBC) counts has additionally been stated in physically active people. (Nunes LA et al, 2005 & Van den Bossche J et al., 20015)

Body fluids are divided into unique components, certainly one of which flows all through the vascular system. In sports body structure, blood is particularly critical as it incorporates oxygen, carbon dioxide, and other substances required using tissues (Edington et al, 2004). Blood is typically composed of plasma, red blood cells (RBC), white blood cells (WBC) and platelets.All studies specify that long-time period normal exercises make high-quality contributions to human

organisms. Researchers have stated the high-quality contribution of exercise in bodily, physiological, mental and motor functions (Fox et al., 1999). The evaluation of hematology proves that the effect of regular exercise on hematology is distinctive. It is said that those variations rely on the severity, period and frequency of exercise in addition to the physical and physiological situations of topics (Buyukyazı and Turgay, 2000).

Various research has counseled that dynamic physical activity can cause a rapid increase in white blood cellular rely in human beings (Hedfors, E. et al.,1976) It's been stated that total peripheral leukocytes will increase in reaction to mild to excessive workout and/or activity till the point of exhaustion (Aghaalinezhad, H., et al.,2002). Exams decided elevated leukocyte parameters from the spleen, bone marrow and lungs through hormonal changes and improved circulation in response to a session of exercise (Tayebi, M., et al.,2011).

Despite the excessive interpersonal version, it's far broadly accepted that physical exercising might also sell adjustments within the immune system.(Navalta JW et al.,2007) Even acute bouts of workout can alter the quantity and function of leukocytes.(Green KJ et al., 2002) The amount of WBC trafficking depends on the depth and period of exercise. (Edwards KM et al.,2007). Several factors may also have contributed to the conflicting statistics which include the health popularity of the individuals and variations in the exercising type, intensity, and period. It is noteworthy that not one of the previous studies evaluated the outcomes of various exercising intensities on leukocyte counts and subsets using standardizing the strength expenditure of the classes and controlling the interpersonal version in the WBC ranges.

With this view in mind, the researcher conducted the present study to investigate the acute effect of continuous running on White blood cell status.

2. MATERIALS & METHOD

PARTICIPANTS

Ten (10) physically trained boys with an average age of 23.16±1.85 years who were studyingfora bachelor of Physical Education, participated in this study voluntarily. These subjects were healthy, nonsmokers, without a history of hematological disease and free of infection.

STUDY DESIGN

1. **Blood was taken from every ten subjects before and just after the continuous running. A total 35min running season will be administrated as 15 minutes running then 5min rest and again 15 min running with their maximum effort.**

3. DATA COLLECTION

Blood samples were taken in the morning from 7:00 to 8:00 am. Blood samples with 5 ml EDTA (Ethylenediaminetetraacetic acid) were taken from players in the forearm ante cubical area, in line with hygiene rules before and immediately after the continuous running. Hemoglobin levels were analyzed by the expert pathologist at the standard laboratory with a Sixmex auto-hemato analyzer.

STATISTICS ANALYSIS

Measurement results were presented as average and standard deviation. Student T-test for dependant samples was used to make a comparison between BE and AE values. *P<0.01* value was considered to be significant.

4. RESULT

The findings of the study indicate that the Hemoglobin level of physically trained boys was significantly increasedimmediately after 35 minutes of continuous running. Though pre-exercise and post-exercise both values of white blood cell counts are approximately in between the normal pathological range.

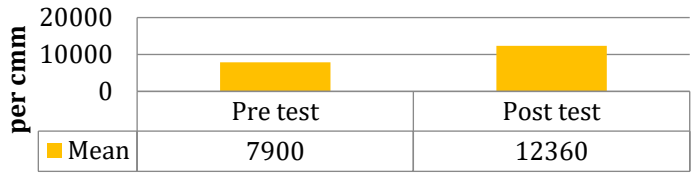
Table-1

Status of White Blood Cell (per cmm.)					
WBC		Mean	SD	"t" value	"p" value
	Pre-exercise	7900	972.96	11.446	0.0000001*
	Post-exercise	12360	1888.6		
P<0.01*					
or gm/dl					

INTERPRETATION OF TABLE- 1

Significant change in WBC was evident in pre and post-continuous running *(t*=11.446*, p<0.01)*

Fig.1 WBC status of pre and post continuous running



5. DISCUSSION

In this present study, it is found that the mean white blood cell count of the students was increased significantly after continuous running. This finding supports the outcomes of Edwards KM et al (2007), who said that acute exposure to short-term stress (e.g., physical exercise) can lead to changes in the white blood cells.

The increase in lymphocytes is transient and the degrees of those cells return to normal range after 2 hours (Natale VM, Brenner IK, Moldoveanu AI, et al..2003). There is a tremendous upward thrust inside the lymphocyte apoptosis ratio when the workout intensity is accelerated (Navalta JW, et al.,2007) and expanded apoptosis in monocytes and lymphocytes after exercise (eighty-five % VO2max) (Tuan TC, Hsu TG, Fong MC, et al.2008). Athletes who go through different intensities of bodily exertion exhibit modifications in the mitochondria of leukocytes and extensive exercising causes DNA damage in lymphocytes (Cury-BoaventuraMF et al.,2008 & Mars M et al., 1998). Leukocyte apoptosis also has a crucial role in retaining lymphoid tissue homeostasis and heading off immune activation (Worth A. et al., 2006). Some evidence suggests that glutamine metabolism delays spontaneous apoptosis in neutrophils in human beings and rats (Pithon-Curi TC et al., 2002). During intense exercise, the spleen, thymus, and lymph nodes are exposed to glutamine deficiency because the demand from other tissues for glutamine is better than the quantity produced using skeletal muscle; this influences the wide variety and the characteristics of leukocytes (Pithon-Curi TC, Schumacher RI, Freitas JJ, et al.,2003).

Acute exercising mobilizes leukocytes. This ends in leukocytosis mediated via an extended wide variety of circulating and tissue lymphocytes (Prestes J, de Ferreira CK, Dias R, et al.,2008). These changes are dependent on the intensity and duration of the exertion by exercise (Pedersen BK, Hoffman-Goetz L.,2000). It's been suggested that the brain releases neuroendocrine mediators that assist the immune device, once an organism is tensed (Viswanathan K, Dhabhar FS.,2005). Workout bouts are accompanied using an intensity-dependent increase in sympathetic physical activity (e.g., catecholamine release) (Kruger K, Lechtermann A, Fobker M, et al.2008). For that reason, the greater the depth of exercise, the greater the rise in the circulating process of epinephrine and norepinephrine (NOR) with the next mobilization of white immune cells (Natale VM et al.,2003)

The present study demonstrated that the acute effect of continuous running on WBC counts is increased significantly. This increase in WBC could be explained bythe fact that lymphoid organs are innervated by sympathetic nerve fibers that respond to stimuli by releasing epinephrine and NOR (Prestes J, et al. 2008). The strongest point of the prevailing examination is the truth that was analyzed the effects of exercising intensity on WBC in humans, and it minimized bias via subjecting equal individuals to all experimental situations so they acted as their control.

6. CONCLUSIONS

From the results of the study, it can be concluded that Hemoglobin levels displayed significant incensement about acute continuous running. Though there is some controversy with the other studies, researchers thought that experiments with a greater number of subjects may throw more light on this problem. Similar research should consequently be conducted to shed extra light on the effects on the immune system by using lengthy periods of physical exercising at various intensities in specific varieties of people along with athletes, sedentary individuals and older people.

PHOTOS OF DATA COLLECTION


CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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