

Effects of anaerobic exercise in the morning and evening sessions on some coagulation factors in non-athletes female students of Islamic Azad University of Sanandaj

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ABSTRACT

The purpose of the present research is compare the effects of coagulation factors in non-athletes girls after exhaustive anaerobic activity sessions in the morning and evening. Present study was semi-empirical that was done on 12 non-athlete female students in range of 18-24 years. Exercise protocol was RAST test, that in which each person passed amain 35 meters of distance for 6 times and rest 10 seconds between each stage. Blood sampling was performed Once in the morning (8 am) and a later week in evening (5 pm) in two stages (before and after). Datas were analyzed with Kolmogorov Smirnov test, Levine's test and two-way ANOVA level ($p < 0/05$). The results showed that there was not significative difference between the effects of an anaerobic activity in the morning and in the evening on hematocrit, platelet, partial time Thromboplastin (PTT), Prothrombin time (PT) and fibrinogen in non-athletic subjects. Findings showed that training for normal persons, non-athletes and patients, especially patients with clotting problems, and cardiovascular disease will be suggeste, each activity to be act with caution at morning and during the day.

Keywords: blood coagulation; fibrinolysis; anaerobic activity; fibrinogen; platelets; Prothrombin, Partial thromboplastin

1. INTRODUCTION

Today, sportive and physical activities and its effects on various organells of the body is under consideration so, much information has been obtained. Researchs and studies in this field have shown that sport and exercise has a positive effect on efficiency and keeping the body healthy. However, if physical activity does not done regularly and correctly in accordance of scientific standards, it would not be useful, so would be dangerous for health. According to professionalizing of the sport and earning a better record, athletes need a serious and regular exercise. Since individuals in these activities should to bear high pressure, different views has occurred about of intensity of activities. Some of scientists are opposed of excessive exercises, and some of others have confirmed it. Thus a new chapter and subject in

research of sports began and researchers are investigating the relationship between vigorous activity with the mechanisms of the human body. One of the major systems of body that are affected by physical exercise is blood coagulation so lifelessness of systems depends on blood coagulation. Blood clotting is an amazing machine that produces clots in the arteries and cause hemostasis. However improper and uncontrolled its activity accommodating with active coagulation of blood clot cause death. In normal conditions, this system regulate by regulators. To keeping these condition and equilibrium, coagulation factors, regulatory proteins and cells are very impressive. Sudden physical exertion is associated with an increased risk of acute myocardial infarction and sudden cardiac death. In addition, activation of the coagulation cascade and/or reduced fibrinolytic capacity after physical exercise has been reported in patients with cardiovascular disease (6). Researches done on the effects of exercise and sport on blood coagulation factors has provided mixed results in the morning and evening. Nowadays there is not significant effect on Fibrinogen acute endurance activity. Hematocrit, hemoglobin, and red blood cell counts decreased significantly three hours after exercise ($p < 0.05$).

However, no significant variations were observed for MCH, MCHC, MCV and PV parameters ($p > 0.05$) (1). Platelet count increases in exercise and this is probably due to a fresh release of platelets from the spleen, bone marrow and lungs. Studies on the effects of exercise on platelet aggregation and markers of platelet activation have produced conflicting results, and the exact effects of exercise remain as yet undetermined. It is suggested that short term exercise activates blood coagulation and enhances blood fibrinolysis and the delicate balance between clot formation and clot dissolution is maintained in normal populations. No valid conclusion could be reached regarding the actual effects of physical training on blood coagulation, fibrinolysis and platelet aggregation.

This is undoubtedly due to variations in training programmes employed, populations studied, and the analytical methods used (2). Aldmir (2005) in her study Concluded that there is significant difference in the number of platelets of the effect of exercise in the morning and in the evening (4). Ribeiro (2007) review Homeostatic response to acute physical exercise in healthy adolescents. Be seen Platelets, in 1 and 24 h after exercise in a moderately increased thromboplastin time (APTT) and prothrombin time (PT) Slightly decreased (10). It has been reported that interventions such as physical activity have reverse effects or cause a decrease in blood indices and improves these indices. Changes in hematologic parameters such as decreased hematocrit and increased hemoglobin content or platelet count is associated with aerobic exercise in young persons. On the other hand, increased hematocrit occurs as the result of short-term activities and excretion of the body fluids and changes in the rigidity of red blood cells [4].

It has been reported that intense activity causes the hemolysis of red blood cells [5]. and often hematological status lower than normal is observed in athletes who are involved in intense exercise [16]. All these changes showed significant difference in morning and evening (13). According to Different results of this study and other similar studies, in conjunction with the effect of anaerobic exercise on blood coagulation factors and fibrinolysis the athletes and non-athletes persons in the present study efforts examined the affect of this exercises on blood coagulation system and fibrinolysis in the training of athletes and non-athletes, and recovery time.

2. MATERIALS AND METHODS

The semi-experimental study were performed on non-athletes female students 24-18 years of Islamic Azad University of Sanandaj. At first was announced public recall in Azad University of Sanandaj. According to a questionnaire information, said they were cooperating in this investigation, 47 cases were ready for trial. From between this number, the 12 person of non-athletes female students 18-24 years, who were all eligible to participate in the plan, as a non-athletes female group were investigated.

All subjects completed a questionnaire based on questions on a minimum of two years experience in any regular physical activity. The history of hematological disease, and heart disease Were non-smokers and were not taking drugs, particularly when doing research. A few days before the test, done the initial coordination with the authorities of clinical laboratories the city of Sanandaj and with help of the partners has been held a meeting for the detection of fitness and familiarity with the test subjects.

Two days before the exam, final coordination was done with research colleagues and taken to the laboratory and the subjects were asked to measure and criteria mentioned above at 8 am in fasting Sanandadj, Islamic Azad University gym ISG and were ordering to them that they did not have any physical activity 48 hours before sampling. Subjects rested for 30 minutes before starting the test. In rest period, the first stage of sampling (pre-test) was done this order at before exercise and were taken blood samples.

Then researcher divided the participants into two groups and were taken the physical test (RAST test). Immediately after completion of the test, by expert clinical laboratory blood samples were taken from both, in Hall. In desired test (RAST test) subject running at full speed 6 times the 35 meters of distance and does the rest between each 35 meters for 10 seconds. Received Information were recorded on data collection forms from each subject. Second blood samples were taken after exercise (post-test) immediately.

A week later arrangements were taken from the same subjects in the afternoon (17 pm) so the tests the undergrowth and bloodletting were carried out. From The device coagulometer Coatron Made in Germany for measured fibrinogen Factors PT And PTT. Plant Cell Counter - Coulter T-890-CoulTer Made in America and device for measuring hematocrit and platelet nephelometry minineph model AD-200 made in the Netherlands to measure D-Dimer was used. In this study, the analysis was used by Kolmogorov Smirnov test and Levine's test for homogeneity of variance and two-way analysis of variance Level ($p < 0/05$ Collection).

3. RESULTS

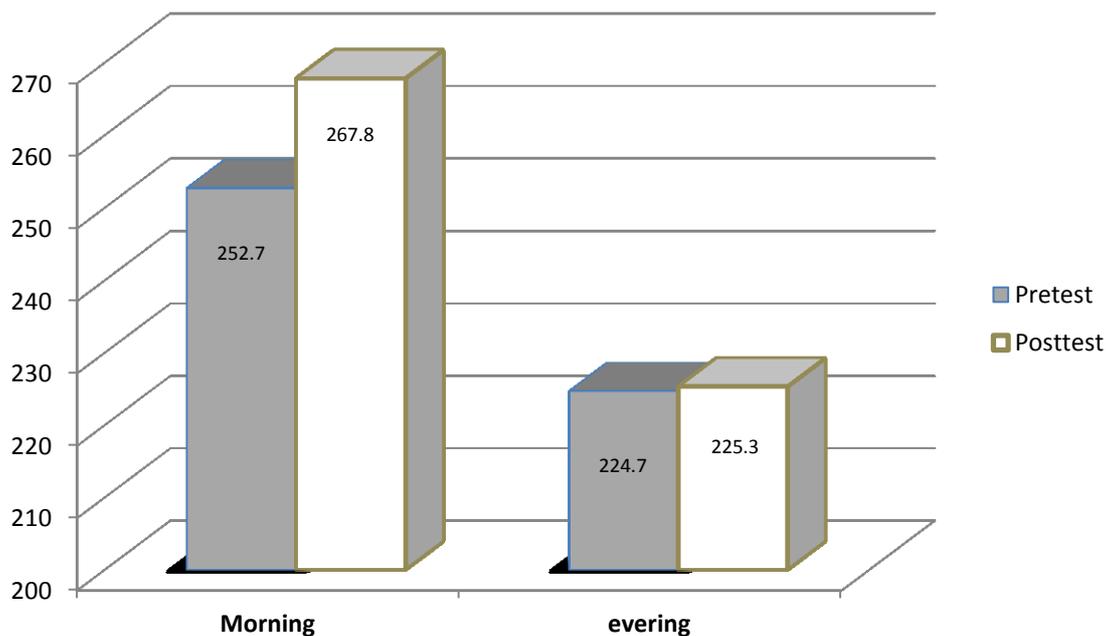
There was no significant difference between The effects of a single bout of anaerobic activity in morning and afternoon shifts on blood fibrinogen in non-athletic female subjects (Table 1).

Table 1. Statistical Indicators of fibrinogen in the morning and in the evening.

Fibrinogen	Mean square	Amount F	Significant level
Time/morning and evening	15841.3	19.01	.14

Stage/ pretest and posttest	546.7	0.65	0.56
Interactive effects – time-stage	833.3	1.46	0.23

(p < 0/05)

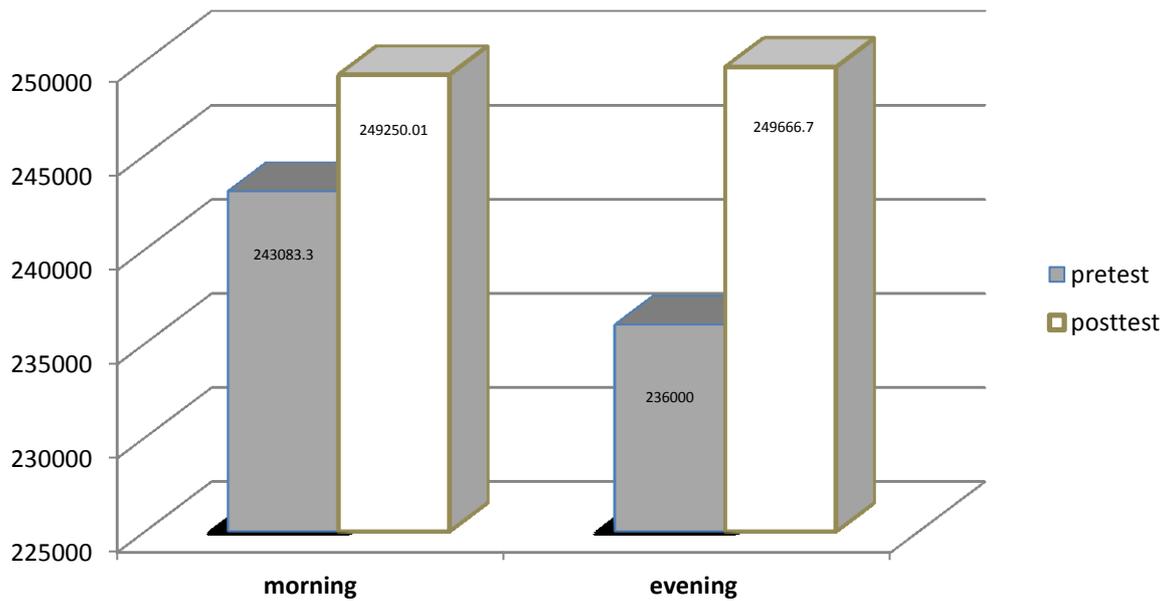


BY analysis of Two-way of variance (ANOVA) was determined that there is not significantly different between the number of blood platelets in morning and afternoon shifts (Table 2).

Table 2. Statistical parameters of platelet In the morning and evening.

Platelets	Mean square	Amount F	Significant level
Time/morning and evening	168750000	3.16	0.33
Stage/ pretest and posttest	1180083333	6.99	0.23
Interactive effects – time-stage	168750000	0.06	0.81

(p < 0/05)

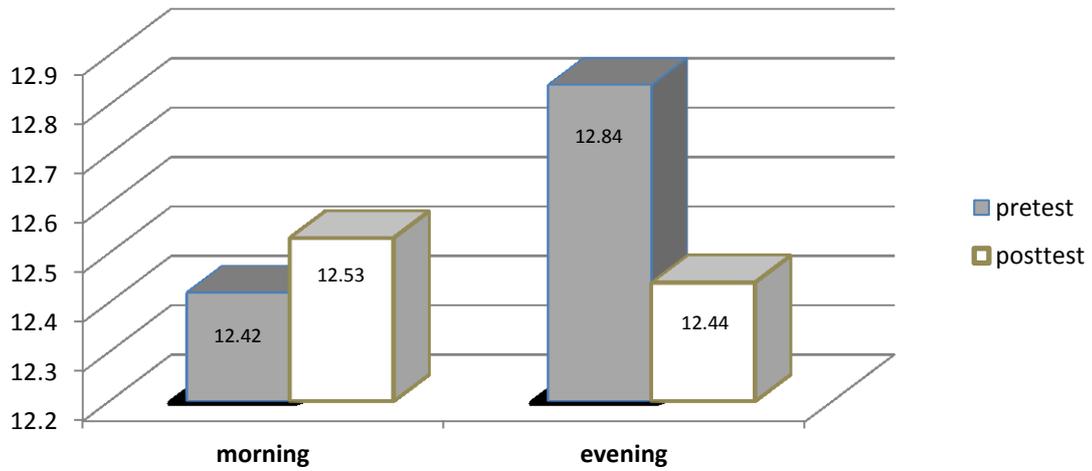


There was no significant difference between the effects of a single bout of aerobic activities and evening appointments on time PT in blood non-athletic female subjects (Table 3).

Table 3. Statistical Indicators Time PT In the morning and evening.

PT	Mean square	Amount F	Significant level
Time/morning and evening	0.31	0.404	0.64
Stage/ pretest and posttest	0.25	0.32	0.64
Interactive effects – time-stage	0.76	1.69	0.2

($p < 0/05$)

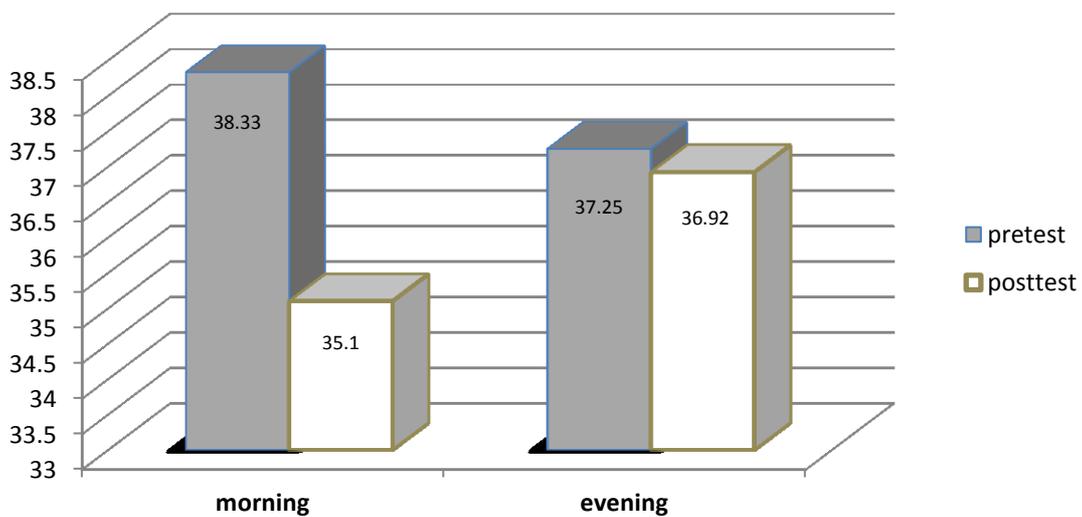


Too by analysis The two-way of variance (ANOVA) Was determined that there are significant differences at the time PTT Blood subjects, in the morning and in the evening will foster (Table 4).

Table 4. Statistical Indicators Time PTT In the morning and evening.

Thromboplastin	Mean square	Amount F	Significant level
Time/morning and evening	9.63	0.24	0.71
Stage/ pretest and posttest	27.7	0.7	0.56
Interactive effects – time-stage	39.4	2.22	0.14

(p < 0/05)



4. DISCUSSION

In this study the influence of an intense activity in the morning and afternoon sessions on coagulation factors of non-athletes female students was examined. During this study was tried as much as possible to be determined the effect of sports activity on variables research parameters and the effect of other factors like anthropometric changes, age and the feeding minimize. Results of this study showed that coagulation responsiveness of inactive girls to a once anaerobic activity, did not show significant differences in the morning and evening. Factors such as Fibrinogen has an important role in myocardial infarction and stroke and on the other hand 16.7 % of all cases of cardiac death associated with exercise during or shortly after it (12).

Physical can cause aberrant stimulation of Coagulation Blood system and also can prevent it. Because of doing physical activity by non-athlete persons so studying of the Homeostasis and process of Coagulation Blood after exercise are very important, specifically comparison of response of these systems to exercise in the morning and evening is considerable. Fibrinogen was increased in response to anaerobic exercise in the morning. But there is not statistically different between the morning and evening. These results are the same as results of Sabouri Sarin (2012) which showed no change significant fibrinogen in the morning and evening. Fibrinogen is an important matter of the coagulation cascade and is a major determinant of blood viscosity and blood circulation. High fibrinogen levels are associated with increased risk of cardiovascular disease and is associated with changes in plasma fibrinogen. Some of the scientists showed increasing or decreasing of fibrinogen by different training programs that these happening may occur because of exercise intensity, fitness level and type of activity (3).

Siahkhouhian (2012) reported a significant difference between the morning and evening (13). PT is extrinsic pathway of coagulation initiation and shortening of it is dependent on the concentration of prothrombin. Reduced of it have direct relationship with increase of Thrombin generation. Athletic activity cause increase of production of Thrombin and likely to cause expression Tissue factor at now circulation. The is that with athletic activity increase the finds. It is likely that changes PT physical activity may depend on the type and severity (7). Between prothrombin time in the morning and in the evening there was no significant difference. Time of Thromboplastin at reply to exercise was reduced that this reduction was significant at morning, but in evening did not show significant differences. and also not statistically different between the morning and evening. PTT is one of the indicators of coagulation which is slower than PT and with its collagen begins mechanisms with damage to the blood vessel wall is damaged and contact and horns p and it is the internal pathway of coagulation parameters, exercise can be cause activation of endothelial cells and stimulates the secretion of von Willebrand factor (8). Reason of reduction in the morning can be rise in blood pressure attributed to evening. PTT values of Resting of in the morning probably was reason to hormonal changes and can explain the further reduction of PTT. Martin proved (2009), lack of significant differences of PTT after work in the morning and evening (9). Number of Platelets was increased at reply to anaerobic exercise; but did not have difference in two times of morning and evening. Lack of change at two period of time is contrary with Aldmir research (2005) (4).

Reason of it can be type of practice at present research. Increase of platelet levels can be associated to the release of new platelets from Spleen and bone marrow and also associated with the vascular bed and the secretion of epinephrine, and which causes contraction of the spleen, where about a third of Platelets are stored in it, and the release of

epinephrine during exercise is too much, this mechanism can be explanation of the large increase in the cycle platelet levels in exercise (5). Sabouri Sarin (2012), observed significant difference in platelet after activity in the morning and evening (12).

5. CONCLUSION

According to the present study a anaerobic activity session cause activation some of clotting factors in the blood. Practical results of the present research show that although physiological responses of body did not difference significant to the challenges of physical activity in people in some pretty factor in the morning and the evening ,but changes in certain factors in non- active people is important for design the exercise program. The highest level of resting platelets, fibrinogen and PTT was observed in the morning. So we can say that the risk of thrombosis and cardiovascular disease is higher in the morning. Based on the results we can say that order the exercise program for the common people, the elderly and patients, especially patients with clotting problems and cardiovascular disease at the time of day and exercise program should be cautious in the morning. This results at planning Intensity of exercise for the non-active people Particular at top Period These Sour Help The Will It was suggested that more research. Researcher refers to doing more research on this factors for the effects of long term exercise on people with different ages.

ACKNOWLEDGMENT

With many thanks to the participants and officials from the Islamic Azad University of Sanandaj, that present study was not possible without the cooperation of these ones undoubtedly.

References

- [1] Arazi H., Damirchi A., Mostafaloo A., *Journal of Jahrom University of Medical Sciences* 9(2) (2011).
- [2] Mahmoud S. El-Sayed, *Sports Medicine* 22(5) (1996) 282-298.
- [3] Ahmadizad S., EL-Sayed M. S., *J Sports Sci*, 23 (2005) 243-249.
- [4] Aldemir H., Kiliç N. (2005). *The effect of time of day and exercise on platelet functions and platelet-neutrophil aggregates in healthy male subjects*. Department of Medical Biochemistry, Faculty of Medicine, Gazi University, Ankara, Turkey.
- [5] Arazi H., Asghari E. Lotfi P. (2009). "Effects of an exercise session and preparing special kung fu skills on hematologic variables, exercise physiology and physical education. pp. 235-240.
- [6] Eriksoon-Berg Margita, Egberg Nils, Eksborg Staffan, Schenck - Gustafsson Karin (2002). Retained fibrinolytic response and on coagulation.
- [7] Lund T., Kvernmo H. D., Osterud B., *Blood Coagul Fibrinolysis* 9 (1998) 63-69.
- [8] Lekakis J., et al., *J Thromb Thrombolysis* 25 (2) (2008) 179-84.
- [9] Martin H., Straub P., *Thrombosis Research* 123(4) (2009) 622-630.

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- [10] Ribeiro J., Almeida-Dias A., *Sci Med Sport* 10(3) (2007) 164-169.
- [11] Rezaiean Z., Torkaman G., Nadali F., *Pak J Biol Sci* 9 (2006) 2032-2039.
- [12] Saboori Sarein M., Yazdanpoor F., Jahromi M. K., 2012, The Influence of Acute Morning and Evening Exercise on Homocysteine, *Fibrinogen and Platelet* doi: 10.4172/2324-8602.1000109.
- [13] Siahkoughian M., *Biol. Sport* 30 (2013) 125-130.
- [14] Brun J. F., *Clin Hemorheol Microcirc* 26(3) (2002) 155-174.
- [15] Salonen J. T., Nyssonen K., Korpela H., Tuomilehto J., Seppänen R., Salonen R., *Circulation* 86(3) (1992) 803-11.
- [16] Biancotti P. P., Caropreso A., Di Vincenze G. C., Ganzit G. P., Gribaudo C. G., *J Sports Med Phys Fitness* 32(1) (1992) 70-75.

(Received 02 February 2014; accepted 08 February 2014)