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A Study on the Trend of Hemoglobin and Hematocrite Changes Before Climbing to Altitudes, 48 Hours After Deployment on Altitudes and 72 Hours After Returing

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ABSTRACT

Introduction and objective : since particular hypoxia conditions on high altitudes cause different responses and consistencies in human body , the objective of this research was to study the trend of hemoglobin to altitudes, 48 hours after deployment and stability of changes after returning. Material and methods: some 17 non athlete male cases were determinedly selected with an average(mean) age of 38.1 yeare and their blood samples were collected in three stages of before starting, 48 hours after presence on an altitude of 4400 mtrs, and 72 hours after coming down , and the indices were studied . friend man test on the level of <0/05 and version 15 of spss software were used to compare the averages in all three stages. Findings: the result showed that there is a significant difference between the average variables in all three stage, so that the average level of hemoglobin , hematocrite and plate lets were 1.88-3,1012 and 2-3-1 in all three stages respectively. Discussion and conclusion- deploymevt on a latitude of 4400 mitrs for a period of 48 hours , causes in crease of hemoglobin and hematocrite, through reduction of plasma volume, reduce secretion of antidivretic hormone, and also activating erythropoitine hormone, because of hypoxia, low tem perature and moisture on the altitudes, and the ohanges remain relatively stable up to 72 hourse after returning from high altitudes.

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INTRODUCTION

Human beings have evenly , either affected vature, or have been affected by natural factors and incidents of the environments [14].

Mean while mountains and altitudes have a special plece (position) as one of the main components of living environment of human beings [16] progress in technology , and use of machineries and vehicles have inhibited human beings from their active and dynamic nature, and most probably hve caused mny risk factors [6].

During the two past countries, mountaineering has bean introduced as a refreshing and attractive physical activity which has got a special position in different countries. Physical activity on altitudes is followed by various benefits for individuals, which are used by sports coaches and athletes.

Of course besides these benefits some problems may arise for individuals on the altitudes.

The most basic characteristic upon climbing to altitudes is the atmospheric changes of environment so that by increase of elevation, the ambient oxygen density is decreased [14].

This sagittal pressure of oxygen creates elevation specific hypoxic conditions in the body which cause the appearance of hypoxic physiological responses in the body. these developments along with changes of respiratory model . Heart beat and blood pressure are able to reduce the performance of individuals climbing to altitudes [11]

By climbing to altitudes under conditions of barometer pressure with low density of oxygen heart beat of rest and sports increase [1]. By consist age of body on the altitudes, gradually, the succession of resting heart beat is reduced [5].

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Different research cases are seeking to answer questions such as period of staying on altitudes extent of altitude, type of exercise, and the rate of effects on the performance (functioning) of different organs of human body.

In a research by rushoh (1996) it was shown that the level of hemoglobin hd increased in athlets who had exercised on an altitude of 1800 mtrs for 18-28 days pugh (1964) explains in his research on heart beat that by climbing to higher altitudes (5800 mtrs) , under conditions of low working rate , the number of heart beat has bean higher than the sea level , but by intensifying working , the number of heart beat is equal or lower than the sea-level zones.(regions)

In a research by Pugh [9] study on altitude longer than 36 days in crease of hemoglobin concentration level, and mass of red

Blood cells. the results of a research by favra showed that staying on altitudes for a short period (one hour on 4300 mtrs) has no effects on the level of blood hemoglobin.

Ln a research by piehl [13]. physiological and hematocrite changes caused by exposure of individuals to hypoxia were studied the sagittd pressure of blood oxygen and saturation of oxygen reduced significantly during 10(ten) days of staying in hypoxia . hemoglobin and hematocrite reduced after two(2) days in hypoxia, and than returned to the primary level .

In a study by knaupp [7] the correlation between continuation of exposure to hypoxia (hypoxic) environment at the level of plasma erythropoitine in healthy (individvals) were studied , and no increment in erthropoitine was observed after 5-60 minutes . with respect to the aforesaid items and the results obtained in most research cases, since a stay of longer than one weel , has been considered to study the effects of altitude , on blood and physiological factors and also with respect to the faet that in most research cases , athlete individuals have been used as test samples , the present research has studied the effects of an altitude of 4400 mtrs on hemoglobin and hematocrite level of a group of non athlete males, before climbing to altitudes , 48 hours after climbing , and the stability rate of changes 72 hours after returning , the results of which could be used to upgrade the awareness of individuals interested in climbing the altitudes(elevations), and enable those who climb the elevations to have a higher efficiency in a shorter time . more over , the results of this research could provide mountaineers will valuable information so that they will be aware of normal and some times abnormal changes in their body upon climbing elevations and they will be able to have successful climbing with the least unpleasant and dangerous complications.

Method of Research:

The present research was in the type of semi- experimented. The participants in this research were selected determinedly among non athletic make in the age range of 30 to so years , and the effects of independent variables (elevation) on dependent variables (hemoglobin and hematocrite) were studied .

The statistical samples in the age- range of 30 to 50 years , who were selected determinedly data analysis have bean provided in two descriptive and analytical parts.

In the descriptive part statistical characteristics such as average (mean) standard deviation high and low limits (extents) were used , and in the analytic part (inferential) also statistical correlations between independent and dependent variables of the research were studied data analysis of the research was done using parametric test of repeated measures , and spss software version 15.

Findings:

Indices of central propensity , average(means) value and indices of dispersion, and standard deviation were used to describe the studied variables also comogrof – spirnif statistical test was used to assess the distribution of numerical variables in view of the level of conforming with normal theoretical distribution since the p value was not less than the significant level of a$\leq$ 0/05 in ang of the studied variables , so the distribution of the variables , were in conforming with normal the critical distribution . There fore parametrical test was used to compare the variables.

Variance analysis test for repeated measures was used to study the changes of dependant Variables and the multiple Comparisons test was used through Calculating the least Significant difference. For one by one Comparison of the average (mean) Valves of the variables with each other.

Table 1: Resull of variance analysis is test of repeated measures of dependant Variables.

Row	Jndex	Total Squares	Degrees of freedom	Average Squares	F ratio	Significance lenel
2	Hemoglo bin	3801/03	2	3801/03	6.69	0/001
3	Hemato crite	38890/03	2	38890/03	1/32	0/001

As it is observed in the test table the means of all variables have been different in three Consecutive periods and as it has also been specified by asterisk in the jable there are significant changes between different

measurement in all variables in other words in all of them the contrary assumption is rejected and the research assumption is accepted

Table 2: Resvll of double comparison of dependant variables through LSD Test.

Row	Variable	Row index	Column index	Average difference	Standard deviation	Significance Level
2	Hb	1	2	-1/∝ 0	0/085	0/001
			3	-0/682	0/056	0/001
		2	3	0/718	0/063	0/001
3	HCT	1	2	-4/46	0/361	0/001
			3	-2/13	0/159	0/001
		2	3	2/32	0/32C	0/001

As it is observed in the table of double Comparison of variables the difference between all stages have been significant in comparison to previous stage Therefore in all variables the Contrary assumption is rejected and the research assumption is Confirmed.

Discussion and conclusion:

According to the findings of this research the Concentration rate of blood hemoglobin and hematocrite had increased 48 hours after climing in comparison to the rate before climbing and 72 hours after returning from elevations all hovgh the rate reduced but did not reach the rate before climbing and vsing multiple comparisons test it was specified that the changes observed in the Variance analysis test have been existent between all stages and the results of this research are Consistent to the research cases carriecl out by Ruskoh [15] Piehl [13] Knaup [7]. Faura [3] pugh [9].

Maybe we can say that the first reason for the increase of hemoglobin Concentration arise from reduction of plasma volume on the elevations (altitodes) and Simultaneous in crease of red blood cells is new. There fore hemoglobin will also in crease and subquently hematocrite will also in crease.

Anothere probable reason for those changes is reduction of anti diuretic hormone in a form that by deployment on an altitude and hypoxia is reduced and subsequent

Rate of this hormone is reduced and subsequently the output of liquids is in creased through urine which cause a reduction of intratissveamd intracellular liquids and ultimately for Compensation (Compensation) of this defect a part of plasma liquid enters intra tissue and intracellular section and in this form the plasma volume is reduced and subsquntly the level of hemoglobin and hematocrite will in crease in the volume dire ctly correlates to reduction in secretion of antidiurtic hormone in chronic hypoxia and dehydration [18]

An other reason for these changes has been exposure of samples in hypoxia Condition and activation of erythropoietin hormone which in turn affects bone marrow and cause the formation of red blood globules and the number of red blood cells will increase.

Very low moisture on the high altitudes probably accelerates body dehydration which may resulting reduction of plasma which will be followed by in crease in the rate of variables Because of cold weather an the altitudes absolute moisture is very small quantity of water [17].

Generally speaking and as an interpretation to all hypotheses it could be said that since the period of consistory to hypoxia condition is close to the period ofter returning from altitude this means that the longer stay on altitudes proportional to the period physiologic

Changes will be more stable and will dies appear move slowly after returning from elevations (altitudes).

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