

Variation of physiological parameters between winter & spring in human subjects in Kirkuk.

Esmat J Jamel,

Dept. of Basic Sciences, College of Nursing, Kirkuk University

Abstract

A considerable information accumulated about normal composition of blood.(89) eighty nine male and (40) forty female were attended to this study aged from 18-41 years old to investigate the effect of season on some blood parameters. The samples of venous blood were collected at the October 2005 to may 2006. All blood parameters haemoglobin (Hb), packed cell volume (PCV), red blood cells (R.B.C),mean corpuscular volume (M.C.V),mean cell haemoglobin (MCH) of male and female were within normal range of healthy subject &also MCHC mean cell haemoglobin concentration normal. There are significant differences between the male and female student. Surprisingly, there is no significant effect of season on blood parameters. The pulmonary function test include, the measurement of peak flow meter and the inspiratory volume. There is significant difference in the value of pulmonary function between male and female students.

Introduction

The normal adult level of blood parameters is being reached at 14 years of age. This level is maintained until old age. At which time there is usually gradual drop (1). However, women have a lower erythrocyte count than men, but there is no significant difference before puberty or in old age (2). A minor degree of diurnal variation occurs. The haemoglobin (Hb) level is slightly higher in the morning than in the evening.

Day to day variation occurs to a greater degree and most pronounced in women (3). Blood is a suspension of red cells, white cells, and platelets in a complex solution (plasma) of gases salt, proteins, carbohydrates and lipids (6). The aim of this study is to investigate the effect of seasonal changes on some physiological parameters in normal healthy subjects.

Subjects and methods

Hundred and twenty nine (89 male and 40 females) from the collage of Nursing\ Kirkuk university were subjected to this study. There age range between 18-41 years). All female students were at the menses period. Pregnant women were excluded out of study. This study was carried out from beginning of October 2005 to may 2006 (winter & spring).

Six ml of venous blood from middle forearm vein collected in the tube containing

anticoagulant with K2EDTA for heamatological investigation; Red blood cells (RBC), Heamoglobin (Hb), pack cells volume (PCV) estimation.

Blood cells counting were male by using improved Neubaur haematocytometers, while hemoglobin (Hb) estimation by using sahli's method and pack cell volume (PCV) by microhematocrit (4).

Statistical analysis was carried out using student t-test and the value $P < 0.05$ indicates the significant differences between the season. Mean cell volume (MCV) was calculated according to the formula.

$$\text{MCV (in femtoliter)=} \frac{\text{PCV(\%)}}{\text{RBCs counter (L)}} \quad (7)$$

Mean cell hemoglobin (MCH) was calculated according to formula.

$$\text{MCH (in picogram)=} \frac{\text{Hb(g/L)}}{\text{RBC count (L)}} \quad (7)$$

Calculation of mean cell hemoglobin concentration (MCHC) was performed according to the formula:

$$\text{MCHC(g/dl)} = \frac{\text{Hb(g/dl)}}{\text{PCV (\%)}} \quad (8)$$

Pulmonary function test was examined for the 129 subjects by measuring the peak expiratory flow rate (Standard Wright peak flow Harlow London)), and inspiratory volume measuring, (Voldyne 3000 USA).

Results

All blood parameters (RBCs count, Hb concentration and PCV percentage) of male and female students were within the normal range of healthy subjects.

However there were no significant differences between the value of RBCs count from October to May as shown in table (1, 2), but there was significant differences in Hb & PCV values ($P < 0.05$).

RBCs count, Hb concentration & PCV percentage (value) showed significant differences between male and female ($P < 0.01$) as shown in the table 3.

Discussion

Blood is consist of red blood cells (RBC), white blood cells(WBCS),platelets in a complex solution (plasma) of gases, protein, carbohydrates, and lipids (6). A considerable amount of information about the normal range of blood parameter was accumulated (2,3).

However the establishment of the normal for a given data or measurement depend on the accuracy and precision of the methodology and the criteria used to define a health normal person. Most investigation use random, apparently health subjects.

Some use subject who either have been on supplementary iron (9). This could explain the difference in RBCs count between male and female. In the present study, significant differences in RBCs count between male and female students was found. It is likely that subclinical nutritional deficiencies account for these differences in which cause such persons can not be considered haematologically normal , or due

to the fact that RBC count in males are higher than females (2).

In the present study, there are significant differences in RBCs. Hemoglobin concentration and PCV (%) between male and female.

All blood parameters in the present study are within in the range measurement and agreed with the previous works (2,3). Surprisingly, there is no significant effect of climate on blood parameters and pulmonary function test. This result could be explain as all student bad not read exposure to cold climate or there are acclimatized to stress (5).

Hb level is higher in morning than evening this lead to high level of cortisone found in morning & return to less level in evening. The level of peak flow meter and inspiratory volume measurement were with in the normal range and it is slightly more in the male than female, this may be lead to the anatomical description of the chest except that the level of peak flow meter measurement and inspiratory volume is less in some smoker than the others and also it is less in others that has increasing age,

In the present study that smokers have an effect to the lung function and impaired respiratory function which was clear in the result of smoker subjects who have a low PEFV values (10, 11,12,13).

References

- 1-Vellar, OD. Studies of hemoglobin values in Norway. In old men and women. Acta. med. Scand (1976),182:681.
- 2-Ghai, CL. Textbook of practical physiology. 4th edition. (1990) Jaypee brothers medical publishers. New Delhi.
- 3-Dacie. JV., Lewis, SM. Practical Haematology. 6th. Edition (1984). Churchill Livingstone. London.
- 4-Wintrobe, MM. Boggs. DR & Lukens. Clinical Haematology 8th. Edition (1981). Lea and Febger, Philadelphia.
- 5-Badi MB., Nazmi. B. Effected of heat & cold on acclimatized and non acclimatized. Glass workers. Saudi Medical J. (1981):2:27.
- 6- Berne. Levy. Principles of physiology (1990) p.(188)
- 7-Frances Fichbach, RN. A manual of laboratory and diagnostic tests. 6th edition.

8- Richard Ravel. Clinical laboratory medicine, clinical application of laboratory data. 6th edition printed in USA, 1995:23-239.

9-Garby. L. The normal hemoglobin level. Br. J. Heamatology. 1970. 19: 429.

10-Lange,D.Groty,S.,Nyboe,J., mortensen,J. Appleyard, M., Schnoher. P. Effects of smoking and changes in smoking habits on the decline of FEV. Eur. Resp. J. 1989:811-816.

11-Peat.J.K.,Wollcock, AG. & Cullen ,K., Decline of lung function and development of

chronic air flow limitation a longitudinal study of non smokers and smokers in buselton, Western Australia Thorax. 1990: 45:32-37.

12- Nunn A., Gregg. New regression equations for predicating PEFR in adults. BMJ. 1989; 298: 1068-70.

13-Martin R., Miller. Peak expiratory flow meter changes: implications for patients & healthy professionals. The Airways J. 2004; 2(2): 80-84.

Table (1): Blood parameters of male students.

	Winter	Spring
Hb(g/dl)	15.67 ± 2.71	15.83 ± 2.48
PCV (%)	44.76 ± 8.29	46.13 ± 4.46 **
RBCs (million/mm3)	5.34 ± 2.34	5.13 ± 0.42

Table (2): Blood parameters of female students.

	Winter	Spring
Hb(g/dl)	12.7 ± 1.31	13.4 ± 1.35 *
PCV(%)	37.95 ± 4.63	39.65 ± 4.06
RBCs (million/mm3)	4.97 ± 0.21	4.85 ± 0.29

* P<0.05

**P<0.01

Table (3): Blood parameters of male and female students.

Sex	Season	Hb(g/dl)	PCV %	RBCs Million/mm3
Male	Winter	15.67 ± 2.71	44.76 ± 8.29	5.34 ± 2.34**
	Spring	15.83 ± 2.48	46.13 ± 4.4	5.13 ± 0.42
Female	Winter	12.7 ± 1.31	3.95 ± 4.63	4.97 ± 0.21
	Spring	13.4 ± 1.35	39.65 ± 4.06	4.85 ± 0.29

Table (4): RBC parameters of male and female students

Sex	MCV(dl)	MCH(pg)	MCHC(g/dl)
Male	60.72 ± 6.97	22.57 ± 3.92	37.18 ± 0.64
Female	78.047 ± 8.51	26.82 ± 3.18	34.378± 1.43

Table (5): The Mean ± SD of pulmonary function test in male & female subjects.

	Male	Female
Peak flow meter (liter)	400.8 ± 72.62	386.31* 66.39**±
Inspiratory volume (liter)	2240 ± 289.61	2097.41 ± 369.1

* P<0.05

**P<0.01