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CORRELATION OF PSYCHOLOGICAL STRESS TO SEVERITY OF ANEMIA IN AL-HAWEEJA WOMEN

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ABSTRACT

The objective has been to correlate the psychological stress the women in Al-Haweeja county currently are suffering symptomatic anemia from with some unseen relevant factors which had lead to drop in hemoglobin concentration (Hb g/dL). A total of 200 female aged 20-40 years old (50 women/blood group) admitted to Al-Haweeja General Hospital for general health checkup were encountered. Irrelevant to blood grouping parameter, a significant drop ($p \leq 0.05$) in Hb g/dL were detected, in comparison with control, i.e. group-A (9.81±0.91g/dL); group-B (9.96±1.04g/dL); group-AB (10.08±0.76 g/dL) as well as for group-O (9.97±1.26g/dL). Similarly, (36.44±2.88)%; (36.79 ±2.99)%; (37.08±2.43)% and (36.65 ±3.68)% for PCV, respectively in comparison with control. It is concluded that the significant symptomatic drop in both Hb g/dl and PCV% indicates a mild symptomatic anemia they are suffering from which could mainly be due to the nature of their social life style i.e. recurrent pregnancy, dietary regime in addition to the ongoing current civil war generated from the Iraqi political unstable status in which Al-Haweeja county is involved in have altogether caused them psychological stress.

KEYWORDS: Anemia, Psychological stress, Blood Groupings, Hemoglobin, Al-Haweeja.

INTRODUCTION

Blood parameters, particularly the complete blood counting (CBC) of patients could well be used as an indicator of health condition by physicians due to its sensitivity to any subtle alteration in the internal and external environment. Health reports from Al-Haweeja General Hospital indicated a noticeable increase in women complaining of general weakness. This phenomenon motivated us to investigate the reasons behind such a complaint. Our most work indicated that hormonal alterations were noticed in female college students taking exams in Al-Haweeja.[1] Al-Haweeja, a county situated southwest Kirkuk is under a unique political circumstances for military and political dues. While it is sieged by militia from the external skirts it is occupied by other militia groups from inside. The latter, accordingly, imposed an abnormal circumstances to the habitants which badly affected their quality of life in various aspects i.e. education, economy, health, nutrition etc… which literally lead to many abnormal instability and consequence for a vague future. Their repeated admittance to hospitals and clinics had noticeably increased and sometimes attributed for unknown reasons. Upon admission health centers, physicians, in order to diagnose their sickness, are likely to refer them to hematology specialist for blood analysis. Blood analysis include many parameters i.e. RBC, WBC, platelets counting as well as hemoglobin percentages and differential counting of WBC.

The concentration of RBC is, particularly, more likely to alter in abnormal conditions while any subtle fluctuation in hemoglobin level may have a significant influence on the metabolic performance and state of health in both human or animals.[2] Biosynthesis of hemoglobin is strictly controlled by the organism, although numerous health disorders as well as feeding, toxins and physical factors can significantly influence hemoglobin concentration and formation of erythrocytes.[3-5] The hemoglobin concentration, in turn, particularly, is clinically important in patients with chronic diseases. Several previous studies had linked hemoglobin concentration and age[6], sex[7], nutrition[5], disease[8] and highlands[9], smoking[10,11] and season too[7] while our most recent study has shown that exam stress could cause a considerable alterations in CBC and hormonal alterations.[1]

Bazzaz

Anemic patients will sustain reduction in the hemoglobin RBC with consequence deficiency of oxygen in the blood, leading to weakness and pallor, lack of power,

vigor, vitality, or colorfulness.[12] The hemoglobin, a part of the blood buffer system, has a known concentration in normal human blood of 15-18g/dL. It is usually thought of as the major proteins in erythrocytes circulating in the blood of vertebrates, carrying the oxygen inhaled by the lungs to the respiring tissues in the body.[13] Its concentration does vary with the hematocrit concentration making up the normal values 13.5-18.0 g/dL in males and 12.0-16.0g/dL in female. Pathological deficiency in the oxygen-carrying components of the blood, measured in unit volume concentrations of hemoglobin, red blood cell volume, or RBC number.

On the other hand, blood, is always known as a specialized connective tissue with complete and unchangeable identity. Almost 400 blood grouping antigens have been reported, the ABO and Rh is recognized as the major clinically significant blood group antigens.[14] This system derives its importance from the fact that A and B are strongly antigenic and anti-A and anti-B occur naturally in the serum of persons lacking the corresponding antigen, these antibodies being capable of producing hemolysis *in vivo*.[15]

With the ABO blood group individuals are divided into four major blood groups namely, A, B, AB and O, according to the presence of antigens and agglutinins.[16] The distribution of blood group studies is multipurpose, as beside their importance in evolution; their relation to disease and environment is being increasingly sought in modern medicine.[17] A most recent research has explored a new relationship between blood group and anemia.[18] The intention of this research was also to explore correlation of the anemia with blood grouping in the patients admitting the hospital with the change in their social life e.g. stress, fear and nutrition which Al-Haweeja is known of.

MATERIALS AND METHODS

Between 2-3 mL of blood samples were collected from brachial vein, kept into fresh ethylene-diamine-tetra-acetic ccid (EDTA) anticoagulant vials for analysis. An automated complete blood counting machine was used involved hemoglobin concentration, PVC and ABO blood groupings, with relevant kits of antibodies in routine method (antigen-anti sera reaction) on clean glass slides were carried out of the 200 female (20-40 years old) patients admitted to the *Haweeja General Hospital* for General checkup from January 2013 to January 2014. Packed Cell Volume (PCV) was adopted as a good indicator of the haemogram, especially of the number of circulating erythrocytes and Hb.[19] Hemoglobin concentration was estimated by Cyan-methaemoglobin method.[20] Rhesus factor was excluded from the experiments but focused on the type of ABO. Results were analyzed according to the analysis of variance (ANOVA) F-test using the statistical *MINITYPE* and compared to averages tested Dunkin polynomial significant level ($p \leq 0.05$).

RESULTS

A total of 200 female patients were selected equally of the four different blood groupings (50 each group) complaining of general weakness who have been diagnosed as anemic patients by their own physicians. Upon a personal interview and a questionnaire conducted, they all were diagnosed suffering from stress. The source of the stress was identified to be from the current political situation of *Haweeja*. There has been no correlation found between the blood groupings and the anima they were suffering from. The distribution of the blood groups A, B, and O is shown on table-1 with no significant difference neither in the Hemoglobin concentration nor in Packed Cell Volume PCV% between blood groups ABO ($p>0.05$). However, the difference between the four blood groups and the control patients was significant ($p \leq 0.05$).

(Table-1): Values of Hb in g/dL and PCV% in the four blood grouping which shows no differences ($p \leq 0.05$) amongst them but were significantly ($p \leq 0.05$) lower than the control and from the international values (Guyton and Hall, 2003).[21]

Parameters	Hb g/dL	PCV%
Group A	9.81±0.91	36.40±2.88
Group B	9.96±1.04	36.79±2.99
Group AB	10.08±0.760	37.08±2.43
Group O	9.97±1.26	36.65±3.68
Control	12.30-15.70	40-45

DISCUSSION

Blood parameters, particularly the complete blood counting (CBC), of patients is always used as an indicator of the health condition by physicians due to the sensitivity blood to any subtle alterations in health.[22, 23] Hemoglobin concentration (Hb%) is also one of the most vital parameter in CBC analysis as an immediate alert of an unexpected anemia particularly in patients with chronic diseases.[2,24] The hemoglobin contained in a quantity of blood should always reflect the functional competence of the blood to supply oxygen to the tissue.[25] Accordingly, tissues may suffer hypoxia with any drop in Hb concentration. This might lead to general weakness and jaundice as symptoms of anemia which the patients were complaining from. The results showed insignificant decline in Hemoglobin concentration (Hb) between blood groups themselves; however, the Hb% in this study had significantly declined in all blood groupings in comparison with the international record of healthy people.[4] The significant drop of Hb% in Haweeja women could therefore be linked to the deficiency in certain elements in their diet, e.g. iron, as well as psychological stress generated from the current social and political situation they are undergoing.

Blood grouping, another important and comparatively known parameter, has been found to exhibits a strong correlation with some common diseases like cardiovascular diseases[26-28] gastric cancer[29,30] and even

HIV infection.[31] An attempt was done to correlate psychological stress and the anemia in these patients with their blood groupings. Accordingly, an equal number (50) patients per group was considered for an unbiased results. The PCV% records of the blood groups although showed no difference amongst themselves; however, was lower than those of the international[21] and local records (Hassan, *et al*, unpublished data). This study shows an irrelevant correlation of blood groupings with the PCV. Our results are consistent with a most recent work carried out in India by of[18] but disagrees with another in Nepal.[32] Such variation could be related to several unseen reasons including genetic, race etc. The anemia detected in this study could therefore be attributed to some common features between these two countries i.e. nutrition and life style. These two countries economically are poor countries and therefore, anemia might be a common phenomenon of the health. However, the nutrition regime in Al-Haweeja women is absolutely different than in India. The most common food in Al-Haweeja for ladies is the dairy products i.e. milk, yogurt and cheese as main animal production while Al-Haweeja men feed on meaty product than the dairy (Hassan, *et al*, unpublished field survey).

It has been found that the effect of iron deficiency on estradiol-induced suppression of erythropoietin induction in rats do implicate of pregnancy-related anemia.[33]

While the main duties of Al-Haweeja women are restricted to produce children, do sustain matrimonial conflicts, cook for men or work in farms to support their families in cultivation. Such exhausting heavy works when associated with the lack of important elements e.g. iron could likely cause further health problems including psychological stress. The polygamy phenomenon, a tradition for Al-Haweeja men who may retain more than a single wife in the same house is an extra factor for consideration. Never mind the recent political situation imposed on Al-Haweeja has been so critical in away it had created an extra stress on all residents. The latter could have a negative impact on both short and long term on health i.e. disturbance of the hormonal balance. High estrogen generated from of increase in cortisol due to psychological stress inhibits the bone marrow to produce RBC.[1] Pregnant women often develop anemia concomitant with the increase in serum erythropoietin levels, which are actually lower than those of none-pregnant anemic women due to the possible suppressive effect of endogenous estradiol on erythropoietin induction.[33] Consecutive recurrent gestation in Al-Haweeja women would create a regular anemia in them as an additional cause of drop in hemoglobin.

Health concerns, therefore, are likely expected amongst Al-Haweeja women should the current situation continues to deteriorate. Further researches impose necessity to follow up the current declining health condition of these women by the local health authorities.

CONCLUSION

No correlation of anemia with blood groupings has been possible; however, the deterioration in the quality of life in Al-Haweeja county has been attributed to the degradation in their general circumstances e.g. economical, financial, political, civil war, recurrent pregnancy and malnutrition that altogether may have caused an inevitable psychological stress leading to anemia. Health organizations, worldwide are advised to raise the concerns over the decline in general health aspects in this part of Iraq.

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