

Research Article

A Cross-Sectional Descriptive Study of Relation of Hemoglobin Count and Mizaj in Young Adults

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A B S T R A C T

Introduction: In Unani medicine, mizaj is an area of extensive research. Mizaj's theory is based on the four humor hypothesis from antiquity. Buqrat, a Greek physician (Hippocrates, 460–370 BC), was the one who organized and developed it. Blood, yellow bile, black bile, and phlegm, he thought, are responsible for some human emotions, feelings, and actions. It is therefore important to understand how it relates to functions of the body, which may be influenced by individual mizaj (body type). A diagnostic tool that is suitable for each body type can be selected using this information. Research in this field is limited and conflicting, so young and healthy people were selected for the study. This can be considered a decisive advantage in selecting an appropriate diagnostic tool for treatment in clinical practice if it can be linked to hemoglobin count, which may be affected by individual mizaj (body type). As research in this area is very scarce and inconclusive, participants of young age and clinically healthy have been chosen for the study.

Objective: The present study is to find out the nature of mizaj (body type) with hemoglobin count.

Methodology: Using simple random sampling in Delhi (India) Sixty (60) college students from Ayurvedic and Unani Tibbia College and Hospital, Karol Bagh were selected as per inclusion and exclusion criteria and asked to complete the Mizaj questionnaire followed by checking of hemoglobin count of each participant face to face under supervision. SPSS statistics software 22.0 was used to establish a database for statistical description. The One-way ANOVA test in SPSS was used to analyze the differences between the groups. $P < 0.05$ suggested that the difference was statistically significant.

Results Based on the results it is found that hemoglobin count is highest in people having Damvi Mizaj and lowest in balghami which is in concordance with the experimental hypothesis of this research work.

Conclusion: From this study, it is clear that a possible correlation between haemoglobin count and Mizaj certainly does exist. After that, clotting time could be considered as one of the diagnostic indices of temperament.

Keywords: Mizaj, Saudavi, Damvi, Balghami, Safravi, Tempero, Temperament and Sahli's Haemoglobinoter

Introduction

The Unani system of medicine originated in Greece. The Unani system of medicine may be comprehensive medical system that meticulously deals with the varied states of health and disease. It provides promotive, preventive, curative, and rehabilitative healthcare with holistic approach.^{1,2} Mizaj is basic fundamental principle of Unani medicine, produced when different Kaifiate Arba (qualities) of Arkan (elements) acts and reacts with each other, then previous qualities replaced by moderate quality known as Mizaj.³ The fundamentals framework of this system is based on deep philosophical insights and scientific principle including Empedoclean theory of four elements i.e. air, water, fire and earth, four, four proximate qualities (kafiyat) i.e. hot, cold, dry and wet described by pythagoras.⁴ Maintenance of mizaj-e-motadil means the maintenance of static or constant conditions (homeostasis) in the internal environment of the cells or the whole body.⁵ Since Akhlat (Humours) has its own temperament as it is a mixture of four Khilt (Humour) i.e. Dam (Sanguious), Balgham (Phlegm), Safra (Yellow Bile) and Sauda (Black bile). These four humours combine intermix and form body fluid.⁶ Unani physician have devised some means and ways with certain parameters to diagnose the Mizaj called Ajnas-e-Ashra which are purely supported the sign and symptoms of the individuals. Ibn Sina defines mizaj as the quality resulting from the interaction of opposite qualities present in elements consisting of minute particles so that most of the particles of each element may touch most of the others. Thus, when these particles act and react on one another with their properties, these emerge from there emerges from their properties, a uniform quality which is present in all of them.^{6,7}

A substance containing iron and protein present in blood is haemoglobin. Hb is liable for carrying oxygen from lungs to the varied parts of the body through blood. It is also responsible for carrying carbon-di-oxide from various parts of the body to the lungs. Hemoglobin (Hb) is the protein molecule present in red blood cells that carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues back to the lungs. It is made up of four protein molecules (globulin chains) that are connected together. The normal adult hemoglobin molecule contains two alpha-globulin chains and two beta-globulin chains. In fetuses and infants, beta chains are not common and the hemoglobin molecule is made up of two alpha chains and two gamma chains. As the infant grows, the gamma chains are gradually replaced by beta chains, forming the adult hemoglobin structure (Guyton & Hall, 1996). Each globulin chain contains an important iron-containing

porphyrin compound termed heme. Embedded within the heme compound is an iron atom that is vital in transporting oxygen and carbon dioxide in our blood. The iron contained in hemoglobin is also responsible for the red color of blood. Hemoglobin also plays an important role in maintaining the shape of the red blood cells. In their natural shape, red blood cells are round with narrow centers resembling a donut without a hole in the middle. Abnormal hemoglobin structure can, therefore, disrupt the shape of red blood cells and impede their function and flow through blood vessels.⁸

As per Unani description Hb concentration should be higher in individuals of Damwi Mizaj and also ESR should be slower in them.⁹ Haemoglobin is what gives oxygenated blood its bright red colour. Thus haemoglobin, despite being largely proteinaceous (an attribute of Khilt-e-Balgham) and harbouring an iron ion (an attribute of Khilt-e-Sauda), must be placed in Khilt-e-Dam.¹⁰ Hence, the haemoglobin count should be higher in damvi mizaj.

The study was started with the following objectives. 1. To find the correlation between Hemoglobin count and mizaj, if any. 2. To find out physiological limits of Hemoglobin for individuals of different Mizaj' 3. To introduce Hemoglobin as a diagnostic parameter of mizaj assessment.

Methodology

A cross sectional descriptive study to assess the Mizaj of 60(sixty) clinically healthy young adults of different gender was carried out in physiology department, A and U tibbia college and hospital, Karol Bagh, Delhi during period of 2020-2021. Subjects were given out informed consent to go through details.

Inclusion Criteria

- Individuals of 18-25 years of age
- Either sex
- Clinically healthy individuals

Exclusion Criteria

- Alcoholics
- Smokers and tobacco users
- Pregnancy and lactation
- Past history of trauma
- Volunteers suffering from any physical, mental or psychiatric disorder

Method

Participants came to department of physiology, A and U tibbia college, delhi for haemoglobin count test and mizaj assessment.

Determination of Mizaj (Body Type)

Mizaj of each participant was assessed with the help of mizaj assessment proforma in department which is based on Ajnas e Ashra described in Unani classical literature

and generated by Central Council for Research in Unani Medicine (CCRUM), Ministry of AYUSH, New Delhi.

Determination of Haemoglobin Count by Sahli's Method^{8,11,12}

Apparatus Used for Sahli's Method

Sahli's haemoglobinometer apparatus (Haemoglobin pipette (0.02 ml), sahli's graduated haemoglobin tube, thin glass rod stirrer for haemoglobin tube, Sahli's comparator box with brown glass standard), spirit swab, blood lancet, dry cotton swab, Pasteur pipette.

Reagent's Used or Sahli's Method

N/10 HCl (it is prepared by diluting concentrated hydrochloric acid 0.98 ml of distilled water and volume is made upto 100ml), Distilled water.

Normal Range of Haemoglobin Count in Adults

Sex	Normal Hemoglobin Level (g/dL)
Female	12 or higher
Male	13 or higher

Principle^{11,12}

The principle of Sahli's method or the Acid hematin method is that when the blood is added to N/10 Hydrochloric acid (HCl), the haemoglobin present in RBCs is converted to acid haematin which is a dark brown coloured compound. Diluting the acid haematin complex with N/10 hydrochloric acid or distilled water until the colour of the acid haematin complex matches the colour of the referenced brown glass provided in Sahli's apparatus gives the Haemoglobin concentration.

Procedure^{11,12}

- N/10 HCl was taken in a haemoglobin tube (had two graduations-one side gm/dl, and the other side showed the Hb percentage), up to the mark 20-the lowest marking (yellow marking)
- Venous or capillary blood was drawn up to the 20 microlitre mark of the haemoglobin pipette exactly
- For capillary blood, the tip of the middle finger is pricked with the help of a blood lancet or pricking needle. The first drop of blood was wiped out and blood from the second drop in the Hb pipette was sucked up to the mark of 20 microlitres
- The surface of the pipette was wiped out with the help of tissue paper so that excess blood may not be added to the Hb tube
- Blood dispensed into N/10 HCl acid taken in the haemoglobin tube, pipette rinsed with the same solution, and mixed properly with the help of a stirrer

- Tubes were placed at room temperature for 10 minutes for the complete conversion of hemoglobin into acid hematin
- After completion of the reaction, Hb tubes were placed in the column in Sahli's Comparator box and started to dilute the dark brown coloured compound (Acid Hematin) formed in the Hb tube using the N/10 HCl or distilled water by adding drop by drop of it into the solution and mixed with the help of stirrer after each addition
- This process was done until the endpoint came matching the color of the standard with the colour of the test
- Once the colour matched with the standard brown glass, the stirrer lifted and readings were noted down reading in Sahli's Hb tube by considering the lower meniscus
- One more drop of distilled water was added and mixed properly with help of a stirrer. If the colour was still matched with the standard another drop was added till it matched with the standard and noted down the reading and if it got lighter after adding the first drop it showed the reading taken before was correct. As a final result, the reading was recorded. Reading expressed in Haemoglobin gm/dl of blood

Statistical Methods

SPSS statistics software 22.0 was used for was used to establish a database for statistical description. The One-way ANOVA test in SPSS was used to analyze the differences between the groups. $P < 0.05$ suggested that the difference was statistically significant.

Consent of Participants

A multi-lingual informed consent form was provided to all the subjects included in the study. The purpose of the informed consent form was to obtain permission from each volunteer and confirm their willingness to participate in the study. The form indicated exactly what the study demands, what the volunteers expect from the study, the risks and benefits of their participation, and the guarantee of confidentiality. It stated clearly that a volunteer might withdraw themselves from the study at any time without citing any reason.

Observation

Table I. Distribution of Subjects According to Gender

Gender	Number of Individuals
Male	28
Female	32
Total	60

As per inclusion criteria, 60 volunteers were randomly selected for Mizaj identification and haemoglobin count determination.

Participants in the male gender were 28 and 32 in females. The 60 volunteers were distributed according to their Mizaj as shown in Table 1. Damwi Mizaj included 37, Safrawi included 10, Balghami included 11 and Saudawi included 2 volunteers as shown in figure 1. The maximum number of individuals was Damwi Mizaj. It is because all participants

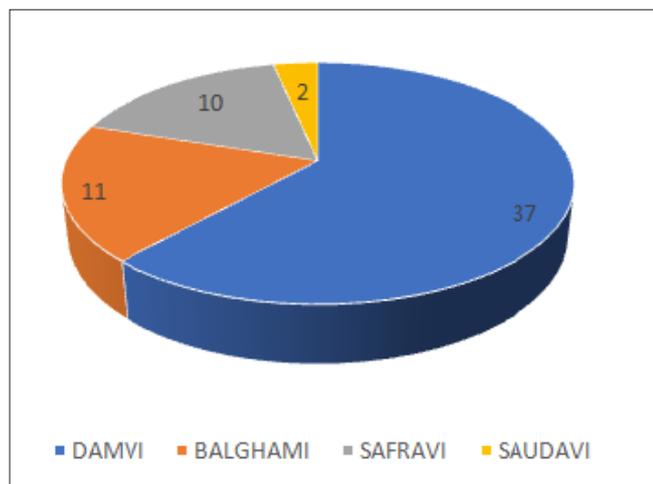


Figure 1. Distribution of Subjects According to Mizaj

Table 2. Mean & Standard Deviation of Haemoglobin Count in Different Mizaj Group

Mizaj	Hb Count \pm SD
Damvi	13.47 \pm 1.86
Balghami	11.99 \pm 2.79
Safrawi	12.47 \pm 2.53
Saudavi	12.5 \pm 0.5

were young individuals between the age group 18-25 years and the Mizaj of young people (sinn-e-namu) is Damwi as stated in Unani classical literature (Ahmad, ynm). Saudawi Mizaj had the least number of individuals.

Mean of haemoglobin count value in Damvi Mizaj individuals is the highest (13.47 \pm 1.86) among all Mizaj groups followed by Saudavi Mizaj (12.5 \pm 0.5), Safrawi Mizaj (12.47 \pm 2.53) and Balghami (11.99 \pm 2.79). One-way ANOVA test was applied to compare Haemoglobin count mean of all four Mizaj groups i.e. Damwi, Safrawi, Balghami and Saudawi Mizaj groups as shown in Table 2&3.

Statistical Decision

Since the computed F of 4.2041 is greater than 2.7694, therefore H₀ is rejected. As H₀ is rejected, it is concluded that the four Mizaj groups do not have the same

Table 3. One-Way ANOVA for Hb Count

Source of variation	SS	df	MS	F	P-value	F crit
Between Groups	26.669-0397	3	8.88-968	4.204-12	0.00-942	2.76-943
Within Groups	118.41-2794	56	2.11-451			
Total	145.08-1833	59				

Haemoglobin count mean and at least two groups had significant difference in Haemoglobin count mean.

P Value: Since 4.2041 > 2.76, $p < 0.05$ ($p = 0.009421$).

Discussion

Mizaj occupies a completely essential place in Unani Medicine. It bureaucracy the premise of the pathology, diagnosis, and remedy of the diseases. The maximum distinguishing function of the mizaj is its approach to individuality. The temperament of a person is a morpho-physio-psychological state that comes into the lifestyle as a result of a dynamic interaction between his genes and the environment. Temperament is an empirical expression describing the humoral composition that governs and regulates the physiological, mental, and pathological changes withinside the human body.¹³ Keeping in mind the features of individuals of different mizaj this study is conducted to relate the relationship between mizaj and haemoglobin count.

The physiological role of haemoglobin is the transportation of oxygen. In classical Unani literature, one of the functions of Dam (Blood) is that it is Hamil-e-Rooh (transporter of oxygen).^{14,15,16,17} At the molecular level, this function is carried out by haemoglobin and Dam is dominant humour in damvi mizaj.¹⁸ Thus, damvi mizaj individuals have a high haemoglobin count which leads to high transportation of oxygen to different tissues in the body. Consequently, oxygen transportation could be higher in damvi mizaj than in other mizaj, which matches the results of this study since damvi participants had the highest haemoglobin levels.

The person with damvi mizaj is more muscular with a prominent pulse and safrawi mizaj person has a medium structure, medium built, rapid and powerful pulse with good digestion which is directly responsible for high BMR and good blood circulation and distribution of oxygen to different tissues¹⁹ in comparison to balghami mizaj have a flaccid and obese body built with soft and flabby muscles, flat chest, not prominent blood vessels, soft, slow and infrequent pulse and saudavi mizaj have lean and thin built with narrow chest, coarse and rough skin.²⁰

which shows characteristics of low BMR and slow blood circulation. Thus, oxygen transportation could be slow in balghami and saudavi mizaj and high in damvi and safravi mizaj which is contrary to the results of the present study as damvi mizaj has high hemoglobin count followed by saudavi mizaj followed by safravi then balghami mizaj. In addition, safravi mizaj was hypothesized to be higher than saudavi mizaj in hemoglobin count but results were contrary to this theory which might be due to the huge sample size difference among damvi, safravi and saudavi mizaj also could be due unavailability of female participants in saudavi mizaj group and also could be to the presence of some anemic participants in safravi mizaj group.

Moreover, Literature from the Unani system of medicine places metal ions in the body in Khilt-e-Sauda.^{14,15} Haemoglobin contains the heme prosthetic group. The heme prosthetic group is an organic ring-shaped molecule, which under its structure is capable of hosting an iron molecule. The haeme itself is made of four pyrrole rings. This tetrapyrrole structure has a substitution on the side chain which allows it to hold a metal ion, in this case, iron, and harboring an iron ion (an attribute of Khit-e-Sauda). Thus, a high haemoglobin count of saudavi mizaj than safravi might be due to the small sample size saudavi participants and saudavi attribute of iron ion.^{17,21}

This study has limitations as the generalizability of the results is limited by a huge difference in the number of participants' sample size among different mizaj and the small sample size of the data. So, this data can't be generalized to the whole population. There is a need for further research with a large sample size to get a better understanding of the correlation between haemoglobin count and mizaj.

Conclusion

Based on the results it is found that hemoglobin count is highest in people having Damvi Mizaj and lowest in balghami mizaj which is in concordance with the experimental hypothesis of this research work. In addition, safravi mizaj was hypothesized to be higher than saudavi mizaj in haemoglobin count but results were in contrary to this theory which might be due the huge sample size difference among damvi, safravi and saudavi mizaj also could be due unavailability of female participants in saudavi mizaj group and also could be to the presence of some anaemic participants in safravi mizaj group. From this study, it is clear that a possible correlation between hemoglobin count and Mizaj certainly do exists but further study needs

to be conducted with a large sample size to get a better understanding and results of the correlation of haemoglobin count with mizaj.

Limitations

This study took into account only those participants who were easily accessible and may not represent the entire population.

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Conflict of Interest None

The authors declare that there is no conflict of interest.

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