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ASSESMENT OF TOTAL BODY WATER IN DAMVI AND SAFRAVI MIZAJ OF HEALTHY MALE BY NON INVASIVE ANTHROPOMETRIC BASED EQUATION

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ABSTRACT

The aim of this study was to assess the total body water in *damvi* (sanguinei) and *safravi* (cholerici) *mizaj* (temperament) individuals through Watson equation, to analyze whether any correlation exists between temperament and total body water and to explore that whether the total body water in *damvi* and *safravi*mizaj were same or different and to develop a new parameter for the determination of mizaj through estimation of body water. The mean and standard deviation of total body water of Damvi and Safravi subjects were calculated. It was revealed after this study that the mean total body waters of Damvi was 41.44 (Lt) with standard deviation of 1.43 while the mean total body waters of safravi subjects was 39.44 (Lt) with standard deviation of 1.86. In this way it can be said that the average total body waters of the healthy Damvi subjects is higher than that of a Safravi subject. The T-test was applied to test the significance of the results and it was found that the difference of total body water of Damvi (Damvi) and safravi (Safravi) subjects was highly significant ($p<0.0001$).

INTRODUCTION

The complex mechanism of the human body and its functions are the most revealing aspect of the nature. According to the Unani discipline, the existence of the human body based on the seven natural and basic components called 'Umoor e Tabaiyah' which are responsible for maintenance of health. These are Arkan (Elements) comprising earth, water, air and fire as different states of matter and the building blocks of everything in the universe; Mizaj (Temperament), Akhlaat (Humors), Aaza (Organs), Arwah (Vital forces), Quwa (Faculties), Afaal (Functions). The loss of any one of these basic components or alteration in their physical state could lead to disease, or even death. Beside other concepts, the Temperamental and Humoral theories are the backbone of this System. The concept of Mizajis one of the basic pillar of unani (Greeco-Arabic Medicine), on which health or disease condition of human being and the entire Unani therapeutics including diagnosis, treatment and prevention of diseases is based upon. Mizaj is an empirical expression describing the humoral composition that regulates the physiological and pathological changes in the human body. Thus, there are no two individuals are same in their Mizaj.

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So each individual due his specific Mizajis said to possess certain innate strength and deficiencies, for which he reacts differently to given set of environmental conditions. The Mizaj is formed by interaction of opposite qualities present in the Arkan (elements). These qualities are primary four in number, namely hotness, coldness, moistness, and dryness. Thus, Unani physicians broadly classified the people into four types of Mizaj either on the basis of humors. These four types of Mizaj (Temperament) are: (1) Hot & Moist: Damvi Mizaj (sanguinious) (2) Cold & Moist: BalghamiMizaj (Phlegmatic) (3) Hot & Dry: SafraviMizaj (Bilious) and (4) Cold & Dry: Saudavi Mizaj (Melancholic). (Ahmad, 1980) The Hippocrates (460-370BC) gave the fundamental principles of Greeco-Arab System of Medicine with a belief that the body of the individual is composed of four basic elements, which together, are termed as 'Anasir-e-Arba' or Arkan' (Elements) comprising earth, water, air and fire as different states of matter and the building blocks of everything in the universe. These four basic elements possess four different qualities, i.e. hot, cold, dry and wet. The admixture of these four basic elements results in the formation of four biological fluids or akhlaat (Humors) viz. Dam (Blood), Balgham (Phlegm), Safra (Bile) and Sauda (Black bile); a right proportion, according to quality and quantity constitutes health and upright proportion and irregular distribution, according to their quantity and quality constitutes disease. Thus the basic principle of Greeco-

Arabic Medicine is that the four humors represented in the human blood (?, 2012).

The Literal Meaning of Mizaj (Temperament)

The literal meaning of mizaj according to Nafis is "Intermixture" as he says "The word mizaj originated from Arabic word imtizaj meaning intermixture". (Nafis, 1910) Mizaj is derived from Arabic word "mzj"(مزج) which means mixing of humors. At other places it is described that mizaj refers to the intermixture of four humors within human body, it is the basis of body. (Lisan-ul-Arab) Temperament – combination or predominance of humours. (Chamber dictionary) Temperament is constitutionally based individual differences in emotion, attention, activity level and self-regulation. (Arshad, 2009) (New Concise Medical Dictionary) Temperament – the combination of intellectual, emotional, ethical and physical characteristics of an individual.(Taber's encyclopedia medical dictionary) Temperament – the physical organization peculiar to the individual, which influences one's metabolic process, manner of thought and action and the general view of life. (Stedman). Temperament is defined as that part of the personality, which is genetically based. Along with character and those aspects that are acquired through learning, the two together are said to constitute personality (Shah, 1972).

Definition of Mizaj: Galen (130-200 AD) says that:

"Temperament is a quality produced by action and reaction of opposite qualities of body fluids (Akhlaat). When these components interact by virtue of their respective powers (qualities) a condition is achieved which is found in equal proportions in all the components of that intermixture; this is called temperament". (Galen, Kitab Fil Anasir, 2008) Ibn Sina (980-1037 AD) in his famous book "Al-Qanoon-fil-Tib" says: "The temperament is a quality resulting from the interaction of opposite qualities present in elements consisting of minute particles so that most of the particles of each of the elements may touch most of the others. Thus when these particles act and react on one another with their properties, there emerges from their total properties, a uniform quality which is present in all of them. This is the temperament (Mizaj)" (Ibn Sina, 1993) Similarly the normal temperament of an individual is defined as "a condition in which he survives comfortably with all systems of healthy life", which varies widely as per composition and as well as other surrounding factors and circumstances in which he resides. Therefore, in this universe all animates or inanimate, however alike in origin and structure does not resemble one another perfectly. The Temperament fluctuates in particular normal range of maximum and minimum limits. Whenever it crosses its normal limit, it leads to the abnormality (Su-e-Mizaj) within the body.

Characteristic of Damvi Mizaj (Sanguine Temperament) Individuals

These people have hot and moist temperament, tall, strong and muscular body, broad chest, large and strong bones and well-formed joints, reddish complexion, thick, black and straight hair which shows rapid growth, mildly prominent veins, full and strong pulse. According to Ibn Sina they have slight feeling of heaviness in their body especially at the base of the eyes, head and temple. They get troubled with hot environment and food. They feel comfortable with cold and dry things and like cold weather. Their digestive power is wonderfully good; the appetite keen, sleep sound, excreted urine is concentrated and in moderate quantity, physical activity and speech are average, psychological aggressiveness and psychic condition comes on easily and easily lost, mental condition is good, in dream red object are seen frequently and the general health is remarkably sound. The sanguinious individual looks everything from the bright side. He is optimistic and is always sure of success. He is extrovert and makes acquaintance with other people (Ibn Sina,, 1993; Christofer *et al*., 1980).

Characteristic of Safravi Mizaj (Choleric Temperament Individuals

These peoples have hot and dry temperament, a medium stature, thin and hairy body, moderate musculature, deficient fat, well-formed and prominent joints, yellowish complexion, thick, curly, black, rough and abundant hairs, prominent Veins, strong and rapid pulse. They pass fiery and yellow urine. Sometimes, they feel sensation of pain and pricks over the body. They feel comfortable with cold things and get troubled with hot things. Their most suitable weather is winter. The safravi (bilious) temperament manifested a short response delay, but the response is sustained for a relatively longer time. Their digestive organs are active, appetite is good and sleep is light and often disturbed. According to Ahmad, these people are proud, revengeful, shrewd, and zealous and get angry quickly. They are also energetic and intelligent individuals with a strong inclination to indulge in sexual pleasure (?, 2012; Ibn Sina, 1993).

Humoral Theory

The humeral theory was postulated by father of medicine Hippocrates (460.B.C) in his book 'Tabiat al Insaan' that: "The body contains four major kinds of humors dam (blood), balgham (phlegm) safra (yellow bile) and sauda (black bile); a right proportion, according to quality and quantity and mixing of which i.e. homeostasis constitutes health and up right proportion and irregular distribution, according to their quantity and quality constitutes disease. Unaniphysician already well known about the importance of fluids or water presents in the human body. They used the term Rutubat (Fluids), Akhlaat for body fluids. The term Akhlaat applies to all fluid of the body irrespective of their color, location, quantity and quality. The word khilt (Humor) literally means an admixture. Asdam (blood), balgham (phlegm), safra (yellow bile), and sauda (black bile) are intermixed inside the blood vessel that is why; these are known as 'Humors' and this admixture is known as blood because blood content use to be more in this mixture as compared to other humors. These humors are different in types and properties and serve different functions. "Akhlaat are the moist and fluid parts of the body which are produced after transformation and metabolism of ailments, they serve the function of nutrition, growth and repair and produce energy for the preservation of individual and his species. Avicenna said in his famous book 'The Cannon of Medicine' that the four components namely Dam, Balgham, Safra and Sauda are the primary humors, but he added that the intracellular and extracellular fluids in the

tissues are secondary humors. The four primary humors are derived from the digestion of food and are utilized as nutrient components for the growth and repair of the organs and to yield energy for work. The humors have a normal state as well as abnormal varieties (Gruner, 1930).

Classification of Akhlaat (Humors)

various criteria have been adopted in Tibb for the classification of Akhlaat, which are as under. According to their locations, According to their colors, According to their usefulness, According to being primary or secondary fluids, According to their quality of fineness and coarseness and According to their quality of being normal and abnormal.

AL-KHILT AL-DAM: Dam (blood) is regarded as mixture of all four kinds of Akhlaat i.e. dam, balgham, safra and sauda. But since the red color is dominating hence, the whole mixture is called as dam (blood). The temperament of blood is hot and moist.

AL- KHILT AL-BALGHAM: All the white or colorless fluids of the body are called as balgham (phlegm) the temperament of balghamis cold and moist.

AL- KHILT AL-SAFRA: All the yellow fluids (and compounds) of the body are called as safra and those fluids are also called as safrawhich express the signs and symptoms attributed to safra. The temperament of safrais hot and dry.

AL- KHILT AL-SAUDA: The most inferior among all the Akhlaat (humors) is sauda. Position of saudais next to safra.The temperament of saudais cold and dry.

Clas Sification of Akhlaat According to Location

Abu SahlMasihi says “all fluids of the body (Akhlaat) divided into three categories”. Rutubat-al-Ustaqussiyah/ Rutubatghariziyah/rutubatasliyah: This is the fluid which is present in the cells i.e. intracellular fluids, which is the protoplasm of the tissue and, therefore rightly termed as rutubat-e-asliyah/rutubat-e-ghariziah/rutubat-e-ula. This a kind of khilt which establish the internal environment of the cells, i.e. mizaj depends upon this rutubat it is also responsible for binding of organs together if this rutub at decrease or vanish, the particles of the organs are shattered.

Rutubat al Urooq / vascular fluid: This type of fluid confined within the vessels e.g. Blood,lymph.

Rutubat al tajaawief: This type of fluid present between the cells spaces, tissue spaces, and various cavity of the body i.e. tissue fluid, intercellular fluid, transcelular fluid. This fluid establishes communication between the Rutubatghariziyahand Rutubat al Urooq/ vascular fluid and responsible for maintain internal environment of the body and Mizaj (Ahmad, 1980). Water is the major chemical component of the body and an essential medium of the body's internal environment. Total body water (TBW) is constantly maintained in normal subjects, although it fluctuate approximately ±5% daily because of ongoing physiological processes and the consumption of food and beverages. However, TBW is largely altered by disease, especially in renal insufficiency. Measurement of TBW is frequently performed to evaluate the body composition and nutritional status in normal subjects and end-stage renal disease patients. First time we used to assist the temperament of healthy individuals. The accurate measurement of TBW is difficult, requiring isotopic dilution techniques which are not easily applicable to the clinical setting. Therefore, several indirect methods of estimating TBW with simple demographic and anthropometric data are commonly employed by researchers and dialysis units, using one of the following: a constant fraction of body weight, i.e. 58% of actual body weight; the Watson formula, the Hume formula, and the Cher tow formula. Knowledge of the total amount of water in the body (TBW) is basic to a full description of human body composition. If TBW values are available, estimates can be made of various body fractions including lean body mass (LBM), fat mass, and total body solids. With studies on human subjects, TBW is usually estimated by dilution methods using known amounts of diluents such as deuterium or tritium oxide or antipyrine, which diffuse freely through all body compartments with no permeability barrier. Although dilution methods are the most accurate available, the expertise, equipment, and time required to determine body water is often out of proportion to the precision of the data required for particular purposes. For rapid approximate estimates of TBW, simple anthropometric measurements can be used to give data of surprising accuracy (?, 1980).

Arthur Guyton 's Textbook of Medical Physiology states that "the total amount of water in a man of average weight (70 kilograms) is approximately 40 litres, averaging 57 percent of his total body weight. In a newborn infant, this may be as high as 75 percent of the body weight, but it progressively decreases from birth to old age, most of the decrease occurring during the first 10 years of life (Guytan, Arthur, 1991). Intracellular fluid (2/3 of body water). Per Guyton, in a body containing 40 litres of fluid, about 25 litres is intracellular, which amounts to 62.5% (5/8), close enough to the 2/3 rule of thumb. Jackson's texts states 70% of body fluid is intracellular. Extracellular fluid (1/3 of body water). Per Guyton's illustration, for a 40 liters body, about 15 litres is extracellular, which amounts to 37.5% Again, this is close to the 1/3 rule of thumb cited here. Plasma (1/5 of extracellular fluid). Per Guyton's illustration, of the 15 liters of extracellular fluid, plasma volume averages 3 liters. This amounts to 20%, the same as per Netter's Atlas. Interstitial fluid (4/5 of extracellular fluid) Transcellular fluid (a.k.a. "third space," normally ignored in calculations) Contained inside organs, such as the gastrointestinal, cerebrospinal, peritoneal, and ocular fluids.

Purpose of the Study

The present study has been attempted with two different categories Damvi and Safravi temperament individuals because these two categories show different types of signs and symptoms as their physiological, physical, and psychological features and are opposite to each other on the basis of their Hot and Cold temperament respectively. Basically these two main states of hotness and coldness play vital role in determination of temperament. The study was started with following aims and objectives.

- To assess the total body water in damviand safravi temperament individuals through Watson equation.
- To analyze whether any correlation exists between temperament and total body water.
- To explore that whether the total body water in Damvi and safravi temperaments were same or different and
- To develop a new parameter for the determination of temperament through estimation of body water.

Hypotheses of the Study

Total Body Water would be relatively higher in Damvi than Safravitemperaments individuals because as per Unani literature, The Damvi (sanguine) volunteers have Hot & Moist temperament and Safravi (choleric) volunteers have Hot & Dry temperament.

Method of the Study

the present study was carried out in the department of Kulliyat, Ajmal khan Tibbiya College, Aligarh Muslim University, Aligarh during the year 2012-2013. The Aim of this study was to find a relationship between the Total Body Water and Temperament of individuals. For the present study fifty (50) healthy volunteers of males in age group of 25-35 years, having safravi and damvi temperament were randomly selected, from Ajmal khan Tibbiya College, preference was given to students residing in hostels because their environment and nutritional status remains almost similar.

Exclusion Criteria: Female volunteers and volunteers below 25years and above 35 years were excluded, the persons of Melancholic and Phlegmatic temperament were excluded from the study, the persons of the athletic activities, heavy exercise and gymnastics were excluded from the study, the volunteers having a history of Radiotherapy, Chemotherapy, major accident and surgery or taking steroids for long periods were excluded from this study and the volunteers, suffering from Malnutrition, Diabetes Mellitus, Poliomyelitis, Tuberculosis, Hyperthyroidism, Hypothyroidism or any other chronic diseases, were excluded from the study. For the selection of healthy volunteers, detailed clinical history, physical, general and local examinations were done.

Determination of Temperament: The assessment of temperament (Mizaj) of the volunteers was made on the basis of Ajnas-e-Ashra (ten determinants), mentioned in classical Unani literature.

Categorization of individual: The selected volunteers were divided into two groups according to their temperament.

Group A: Damvi (DamviMizaj)
Group B: Safravi (SafraviMizaj)

Equipment's for Measurements: Weighing Machine to determine the body weight and Stadiometer to determine the standing height.

Calculation of Total Body Water: TBW was calculated as by the Watson formula

(TBW-W)

[*Male TBW= 2.447 – (0.09156× age) + (0.1074× height) + (0.3362×weight)]*[12]

OBSERVATIONS AND RESULTS

Data obtained in this study was statistically evaluated which are as follows

Table 2. Indicating Total Body Water of volunteers expressed as Mean ± SD*

Temperament	Number of Volunteers	Mean ± SD*
Damvi(Damvious)	25	41.44 ± 1.43
Safravi(Safravi)	25	39.44 ± 1.86
Total	50	

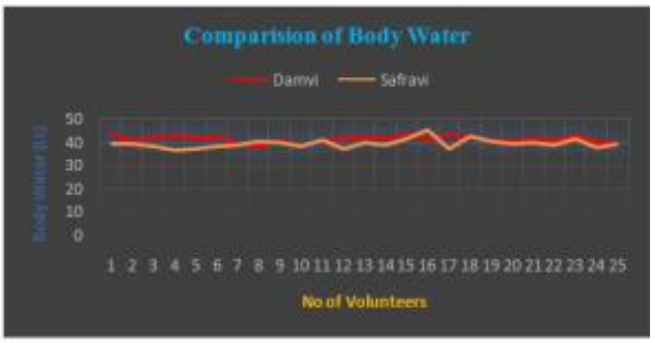
The mean and standard deviation of total body water of Damvi and Safravi subjects were calculated. It was revealed after this study that the mean total body water of Damvi subjects was 41.44 (Lt) with standard deviation of 1.43 while the mean total body water of safravi subjects was 39.44 (Lt) with standard deviation of 1.86 In this way it can be said that the average total body water of the healthy damvi subject is higher than that of a safravi subject. (Table-02, Graph-02).

Table 3. Showing Characteristics of Volunteers Expressed As Mean ± SD

Temperaments	Damvi	Safravi
No. of Subjects	25	25
Age (Mean ± SD)	28.24±1.96	27.8±2.0
Height (Mean ± SD)	173.64±2.5	170.88±3.6
Weight (Mean ± SD)	68.2±4.13	63.04±5.3
TBW (Mean ± SD)	41.44±1.43	39.44±1.86

SD: Standard deviation.

The mean and standard deviation of age, height, weight, and total body water of damvi and safravitemperaments subjects were calculated. It was revealed after this study that the mean of age, height, weight and total body water of damvi subjects was 28.24 (years), 173.64 (cm), 68.2 (kg), and 41.44 (Lt) with standard deviation of 1.96, 2.5, 4.13, and 1.43 respectively, while the mean of age, height, weight and total body water of safravi subjects was 27.8 (years), 170.88 (cm), 63.04 (kg) and 39.44 (Lt) with standard deviation 2.0, 3.6, 5.3 and 1.86 respectively, as shown in table 03.



Total body water was higher in Damvi volunteers as compared to Safravi volunteers and the difference was statistically significant as shown in the graph-03. Present study after statistical analysis showed that the difference of total body water of Damvi and Safravi and temperament subjects was highly significant as shown in Table 03.

Table 3. Showing the Results in Volunteers according to their Temperament

Parameters	Mizaj	Number of Volunteers	Mean ± S.D	Significance
Total Body Water	Damvi	25	41.44±1.43	P<0.0001
	Safravi	25	39.44±1.86	

Significant at the level of p<. 05

RESULTS

The mean and standard deviation of total body water of Damvi and safravi subjects were calculated. It was revealed after this study that the mean total body water of damvi subjects was 41.44 (Lt) with standard deviation of 1.43 while the mean total body water of safravi subjects was 39.44(Lt) with standard deviation of 1.86. In this way it can be said that the average total body water of the healthy damvi subject is higher than that of a safravi subject. The T-test was applied to test the significance of the results and it was found that the difference of total body water of Damvi and Safravi subjects was highly significant ($p<0.0001$).

Conclusion

From the findings of this study following conclusion can be drawn. The individuals having Damvi (sangine) temperament have higher levels of total body water than the Safravi (choleric) individuals. Thus a relationship can be established between the temperament and total body water which validates the Unani claims that Damvi individuals are of more moist temperament than The Safravi (bilious) individuals, they have more fluid value hence larger amount of water as a principle constituent of all fluids as well of life, thus validating concept of tibb of moist and dry temperaments in a relative manner. The concept of humors (bodily fluids) shows its deep relation with the temperament so in this study an attempt has been made to reveal this relationship of the temperament of individuals with their total body water calculation. In our study, it is clearly evident that temperament of an individual is influenced by his bodily fluid quantity. The results show that there does exist a relationship between TBW and the temperament of an individual. The need of the hour is to understand the concept & importance of temperament (Mizaj) and its application in Unani as well as other health care systems.

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