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Original Research Article

A Comparative Study of Spleen Size Determination by Ultrasonography in Males of Bilious and Phlegmatic Temperament as a Part of Hai'at-Ul A'za (Body Physique)

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ABSTRACT

The present study was carried out with an aim to determine the spleen size on the parameters of Hai'at-ul-A'za with the help of ultrasonography among the Safravi (Bilious) and Balghami (Phlegmatic) healthy male participants. By the basic principles of Unani medicine, the spleen size may differ based upon the Mizaj (temperament) of the individuals as persons having hot temperament (Sanguineous & Bilious) possesses morphologically larger spleen size in comparison to those of cold temperament (Phlegmatic & Melancholic) persons. Diseases influencing the spleen size such as life style diseases, hormonal and blood disorders were regarded as exclusion criteria. Cranio-caudal length of spleen 100 male participants from 20-35 age groups divided in Bilious & Phlegmatic groups having 50 in each was ultrasonologically measured. The study inferred that the spleen size is larger in Safravi individuals in comparison to those of Balghami one and it validates the theory of Unani physicians that organs of hot temperament individuals are larger than those of cold temperament persons based their body physic.

Keywords: Unani Medicine; Temperament; Mizaj; Safravi; Balghami; Hai'at-ul A'za; Spleen; Body Physic; Ultrasonography.

INTRODUCTION

The concept of Mizaj (temperament) is one of the basic pillars of Unani Medicine. Health, diseases, and dynamism of the human body are based on maintenance of equable temperament. Diagnosis, treatment, and prevention from disease is also determined by the temperament assessment. [1]

It is specific for each individual fluctuating between certain minimum and maximum limits. [2] Temperament is a quality produced by action and reaction of opposite qualities of two bodies. In spite of action and reaction they neither change the specific form of each other nor did they completely metabolize. But a condition is achieved which is found in equal proportions in all the components of that intermixture; this is called temperament. [3] The temperament of an individual is not an incidental phenomenon but is attained hereditarily from the parents to the offspring. [2] In modern medicine, temperament of an individual is a morpho-bio-physio-psychological state that comes into existence as a consequence of his / her genetic expression and the environmental influence on him/her. [4] Modern concepts have integrated temperament strongly with the interaction of hereditary disposition and environmental influences. Temperament of a person can be assessed with the help of *Ajnas-e-Ashra.* [5,6] Hai'at-ul- A'za is the

most important parameter among the *Ajnas-e-Ashra*, because, it not only completely reflects the temperament but also directly helps in its assessment. [7-10] The Hai'at-ul A'za is described deals with the description of shape, size, structure and appearance of human body. The quantitative measurements of Hai'at-ul A'za may be used not only in assessing the temperament but also to determine differences among the individuals, groups etc. [6] Simply because of it, people are different in their look from each other. This difference is equally present in internal as well as external organ. [11] Hence, there is strong association of temperament with external morphology and constitution of human body. In conventional medicine, Hai'at-ul A'zamay be described best by the term 'Somatotype' used to appraise body shape and its composition, and defined as the quantification of the present shape and composition of the human body. [12] According to which individuals are classified into three main types taking into account the developmental layers of the body: Endomorphy is the relative fatness; Mesomorphy is the relative musculo-skeletal robustness, and Ectomorphy is the relative linearity or slenderness of a physique. [12] Therefore, the constitution and morphology of human body is very important in relation to the temperament. The shape and structure of human body as a whole or of its parts is first which comes in contact with a physician, and on inspection, a physician can easily evaluate the behavioral and psychological traits to a greater extent. So, the understanding of body physique may be used as an important tool in assessing the temperament.

Avicenna maintains that persons of hot temperament have broad, large, and well developed chest; the blood vessels are prominent, while hand and feet are not narrow and short. The muscles around joints are big as growth and constitutional forms of human body are accomplished in the presence of heat. On the other hand, persons of cold temperament possess opposite characteristic sowing to coldness as the natural faculties inherent in the body are unable to fulfill functions of growth. [7] Based on Avicenna's opinion, persons of bilious temperament possess large external as well as internal organs and vice versa in persons of phlegmatic temperament. Hence, measuring internal organ will prove helpful in recognizing individual's temperament and thus, the scientific basis will be added to the unique theory of temperament.

For hundreds of years, Unani physicians have been applying temperament in prevention, diagnosis, and treatment of numerous diseases. Moreover, this theory has been so flexible that can easily accommodate the newly emerging diseases in its fold and their treatment may also be proposed based on the attributes of individuals and the disease establishing its relevance even in modern scientific era.

The present work is based on the alternative hypothesis that there is a difference in spleen size of bilious and phlegmatic individuals, and the same has been validated with ultrasonographic measurement of splenic cranio-caudal length. Although, various studies were done to assess the spleen size in healthy as well as diseased persons in past years but no study were done on comparison of spleen size aimed at temperament of individuals. At present, no evidence-based data is available on this subject. Hence, the present study entitled "A comparative study of spleen size by USG in males of bilious and phlegmatic temperament as a part of Hai'at-ul A'za" was designed to scientifically validate the relation between temperament and body physic with the help modern imaging technique.

MATERIALS AND METHODS

The present study was carried out at department of Kulliyat, Ajmal Khan Tibbiya College, AMU, Aligarh from April, 2013 to August, 2015 with an objective to assess the spleen size by USG in healthy male volunteers of bilious and phlegmatic temperament as a part of Hai'at-ul A'za- the fifth determinant of Mizaj. The study design

was a parallel comparative non-interventional study. Prior to the beginning of the study, the ethical approval was obtained from the IEC, and then the participants who gave the written informed consent and fulfilled the inclusion criteria were enrolled in the study. Male volunteers in age group of 20-35 years, who were found healthy in the history and clinical examination, were included in the study. Exclusion criteria were female volunteers and male volunteers below the age of 20 and above 35 years; and volunteers having Sanguineous& Melancholic temperaments (Damwi al-Mizaj & Saudavi al-Mizaj). Similarly, those suffering from life style diseases, hormonal and blood disorders or any disease that may influence the spleen size were excluded from the study. Volunteers of the athletic activities, heavy exercise, and gymnastics were also excluded from the study. 180 volunteers were screened to determine their temperaments based on a temperament determination proforma; out of which 100healthy male volunteers–50 in bilious and 50 in phlegmatic groups- were registered in the study Figure 1.

To estimate size of spleen among the volunteers, the Cranio-Caudal Length (CCL) length was measured by Ultrasonography (Toshiba SSA-340A ECCOCEE ultrasound machine with 3.75 MHz Transducer). The measurements were taken during deep suspended inspiration to minimize bias due to masking by the lung. The cranio-caudal length was measured on longitudinal axis from superior pole to inferior pole of the spleen so as to record the maximum length in millimeters.

Three consecutive UGS scanning were done in one sitting on every volunteer only at the baseline, and the maximum size of the spleen reported in the concerned scanning was considered for statistical inference. The scanning was performed and interpreted by the registered experienced radiologist. To statistically interpret the weight and height data of volunteers, BMI was calculated using Adolphe Quetelet BMI formula. [14]

Unpaired*t*-test was applied for between the group analysis to establish the spleen size variations in bilious and Phlegmatic temperaments. The result was regarded significant at <0.05. All statistical analyses were performed using IBM® SPSS® Statistics 20 © Copyright IBM Corporation 1989, 2011.

RESULT

The distribution of volunteers according to temperament is shown in Table 1. The significant differences on the cranio-caudal length of spleen in bilious and phlegmatic groups have been depicted in Figure 2. The cranio-caudal length of spleen with relevance to age and BMI between two groupshas been depicted in Table 2, 3, 4, &5.

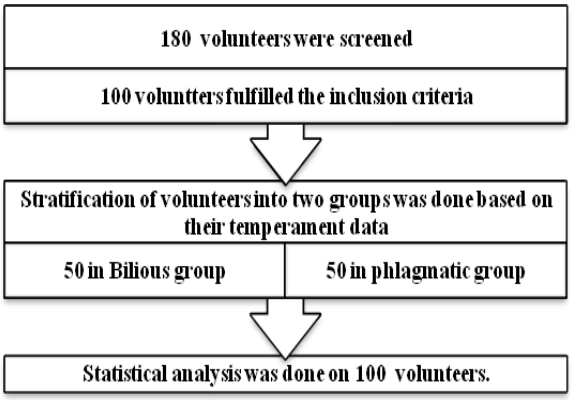

Figure 1: Schematic Presentation of Study Population

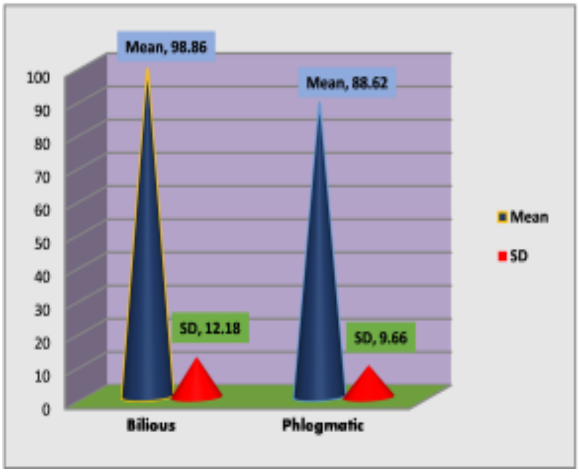

Figure -2: Comparative Measurement of Cranio-caudal Length of Spleen between Bilious and Phlegmatic Volunteers.

Test used: unpaired *t*-test; Bilious vs Phlegmatic analysis was found to be extremely significant at p<0.0001 inferring that the spleen size in the bilious individuals is larger than the phlegmatic ones.

Table 1-Distribution of Volunteers according to the Temperament

Temperament	Frequency	Percentage	Mean ± SD*	P value
Bilious	50	50%	98.86 ± 12.18	p <0.0001
Phlegmatic	50	50%	88.62 ± 9.66	
Total	100	100%		

Test used unpaired *t*-test; SD: Standard Deviation

Table- 2: Cranio-caudal Length of Spleen in Subgroups of Volunteers Age and Temperament Groups

Age Group in Years	Bilious		Phlegmatic		P value
	No. of Volunteers	Mean ± SD	No. of Volunteers	Mean ±SD	
20-23	18	91.60±9.50	06	88.20±14.54	p >0.05
24-27	23	101 ±11.53	18	89.2 ±10.22	p <0.05
28-31	7	107.3±12.68	15	88.15 ±9.28	p <0 .01
32-35	2	110 ± 7.07	11	88.5± 7.21	p > 0.05

Test used: unpaired *t*-test; Significant at p<.05

Table-3: CCL of Spleen of Volunteers in Subgroups of Height

Height (cm)	Bilious		Phlegmatic		P value
	No. of Volunteers	Mean ± SD*	No. of Volunteers	Mean ±SD	
155-160	03	103.13±12.9	06	86.28±9.23	p 0.137
161-166	09	94.11 ±9.81	14	83.85 ±7.31	p 0.0184
167-172	28	100.15±14.48	27	90.71 ±9.24	p 0.0021
173-178	10	98.25± 14.48	03	96.63± 16.71	p 0.893

Test used: unpaired *t*-test; Significant at the level of p<0.05

Table-4: CCL of Spleen of Volunteers in Subgroups of Weight

Weight (Kg)	Bilious		Phlegmatic		P value
	No. of Volunteers	Mean ± SD	No. of Volunteers	Mean ± SD	
41-50	5	92.1± 9.16	00	00±00	---
51-60	12	97.16 ± 8.36	03	73.33 ±10.62	p =0.0004
61-70	27	99.83±18.8	24	86.23 ± 6.78	p < 0.0001
71-80	5	100.24 ±10.85	20	93.72± 8.78	p = 0.267
81-90	1	120±00	1	102±00	---

Test used: unpaired *t*-test; Significant at the level of p<.05

Table-5: CCL of Spleen of Volunteers in Subgroups of BMI

BMI(Kg/m^2)	Bilious		Phlegmatic		P value
	No. of Vol.	Mean± SD	No. of Vol.	Mean± SD	
<18.5	03	89.96±12.22	00	00	----
18.5-24.9	43	98.64±11.85	26	86.53±8.99	p < 0.0001
25-29.9	3	103.76±12.77	23	90.38±9.96	p = 0.223
>30	1	120±00	1	102±00	----

Test used: unpaired *t*-test; Significant at the level of p <0.05; Vol: Volunteers

DISCUSSION

The present study was conducted to validate the concept of Unani Medicine about Hai'at -ul-A'za (body physique) with relevance to the spleen size of bilious and phlegmatic persons. According to the hypothesis, persons of hot temperament have broad, large and well developed chest; the blood vessels are prominent, while the hands and feet are not narrow and short. Conversely, the persons of cold temperament possess opposite characteristics. Inferentially, the persons with hot temperament will possess well developed internal organs and vice versa in persons of cold temperament.

The study revealed that the measurement of cranio-caudal length of spleen by ultrasonography in the bilious (hot) group is larger than that of phlegmatic (cold) group strongly validating the Unani concept of Hai'at -ul-A'za.

Cranio-caudal length (CCL) of spleen was also evaluated according to age in both groups and present study inferred that the mean value of Cranio-caudal length (CCL) of spleen was higher in Bilious volunteers than in Phlegmatic volunteers.

Cranio-caudal length (CCL) of spleen was also evaluated according to their height in both temperaments and statistical analysis yielded that the mean value of CCL of spleen was higher in Bilious than Phlegmatic individuals.

According to weight, the mean value of CCL of spleen was higher in individuals of Bilious temperament than individuals of Phlegmatic temperament. Similarly, the mean value of CCL of spleen was also higher in all subgroups of BMI of bilious temperament than of phlegmatic temperament.

Now it is evident that the inference obtained from the study validates the Unani philosophy which maintains that persons of hot temperament have well developed external as well as internal organs; whereas individuals of cold temperament possess opposite characteristics. Therefore, it is concluded that the cranio-caudal length of spleen is larger in bilious group in comparison to that of phlegmatic group.

The limitation of study was smaller sample size due to limited resources and time. The study may be conducted by inducting larger sample size in order to validate the Unani principle of Hai'at-ul-A'za in view of modern imaging techniques which very minutely measure the internal organs.

In recent years, various scientific works have been done on temperament, and every author has added something significant in its understanding in preview of modern medical sciences. Among them S. I. Ahmed has analytically described Mizaj in view of atomic constitution of human body. He maintains that Mizaj is defined as the new state of a matter having quality different from the present in the elements or compounds before coming into Mizaj (intermixture of chemical combination)which results from the action and reaction among the contrary qualities and powers present in the minute particles (Atoms) of different elements (or molecules of different compounds)when they are combined together, the resultant new quality a uniform state on the state of equilibrium emerging after the combination of more than are elements is called Mizaj". [6] While some modern scientists restrict concept of temperament to basic emotions, [15] and some describe it as personality type. [12] At other end, some elaborated it in a greater extent as morpho-bio-physio-psychological state that comes into existence as a consequence of his/her genetic expression and the environmental influences. [17] Well-known French physicist Richerand gave a new dimension to temperamental theory by describing it as a physical and moral difference among the individuals, which depends on the various proportions and relations among the part that make up their organization, as well as, upon different degrees in the relative energy of certain organs. [16] All these views provide a scientific understanding of theory of temperament.

In recent years, various studies have also been done for measurement of spleen size by ultrasonography in diseased as well as healthy individuals across all ages of both the sexes. [17- 21] These studies disseminate understanding of largest lymphoid organ of the human body [22] by non-invasive [21] and non-ionizing imaging modalities i.e., ultrasonography. [23] But present study is unique in the sense that it establishes correlation of spleen size of the bilious and phlegmatic temperaments.

CONCLUSION

The study revealed that the spleen size of bilious persons is found larger in size in comparison to that of phlegmatic ones which lends the scientific basis to the theory of Unani system of medicine that individuals of hot temperament have broader, larger, and well developed body structures. Smaller sample size and limited resources were the study limitations. Hence, it is recommended that more studies on the said subject may be conducted applying newer scientific modalities to further strengthen the study result.

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