

MEASURING AGE SPECIFIC CHANGES OF PULSE PRESSURE IN DIFFERENT AGE GROUPS

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Abstract-

Background & Objective: The basic concept of pulse and its interpretation is given as collaborative efforts of both Unani and Modern Medicine. Pulse Pressure represents the force that heart generates each time it contracts and it can be related to *Quwat-e-Haywaniyah* which differs in various age groups.

Methodology: This study was carried out in Ajmal Khan Tibbiya College, Aligarh Muslim University, Aligarh during the year 2015-2016. 180 healthy volunteers from 10-60 yrs age were selected for this study. These volunteers were categorised according to *sin-e-namu* (Group A), *sin-e-shabab* (Group B) and *sin-e-kahulat* (Group C). Persons having history of medication, hypertension, diabetes mellitus and arterial diseases and also volunteers from *sin-e-shaikhukhat* were excluded from the study. After taking informed consent, ethical clearance and complete health assessment, volunteers were called to record the Pulse Pressure. Sphygmomanometer is used to record Blood pressure and systolic blood pressure minus diastolic blood pressure is recorded so as to obtain Pulse Pressure in this study.

Results: Mean and standard deviation of Pulse Pressure of group A, B & C was taken. It was revealed after this study that the mean pulse pressure of group A, B & C was 28.1, 37.2, and 41.31 with the standard deviation of 6.36, 5.28 and 5.54 respectively. When data of pulse pressure is compared with ANOVA test, results are found to be highly significant. Value of $F=87.4$ for pulse pressure data. The unpaired t-test was applied to test the significance of the results in between the groups and it was found that the difference of Pulse Pressure of Group A, B and C was highly significant ($P<0.0001$).

Conclusion: There were variations between the three age groups which were almost in concordance with the statements of Unani physician *Quwat* is not eternal, it decreases gradually with age.

Index terms- Quwat-e-haywaniyah, Asnan-e-arba, and Pulse Pressure.

I. INTRODUCTION

Many philosophers and physicians in general, particularly Galen, consider that each faculty has its own principal organ and from this every organ be enacted the functions in different way. The function of the vital faculty is to generate the *Ruh* (pneuma) by processing the atmospheric air and subtle part of *akhlat* in the left ventricle of heart without which existence of life cannot be imagined (Jalinoos,2007) (Major, 1963) (Sina,1993)(Qarshi,1916)(Nafees,1954). Since, it is rightly stated by Aristotle that first of *mabda al awwal or nafs ula* or *Tabi'at* (human nature/physics) pays its attention towards *ruh*, thereby, all the *quwa* of the body perceived. Majusi says *ruh* is a vehicle of *nafs* (psych) through which all sensory and voluntary movements of the body carried out (Majoosi, 2010). Therefore, the imagination of life depends upon the proper functioning of *Quwat-e-Haywaniyah* through its vital organ i.e. heart and its reflection (pulse).

Ibn-e-Nafees (1210-1288 AD) Heart is the seat of *hararate ghariziyah* (innate heat). *Quwat-e-Haywaniyah* enables the organs to receive the *Quwat-e-Nafsaniyah* and helps in furnishing the life to the

organs with the help of *Ruh Haywani*. *Quwat-e-Haywaniyah* of heart pumps the oxygenated blood towards the arteries and thus becomes the source of life to all the organs (Jalinoos,2007).

It will be noted from the above account of the pulse that the contraction and expansion of the pulse does not depend upon the systolic rise and diastolic fall of the heart but on the expansion and contraction of the artery itself (Majoosi, 2010)(Gruner, 1930) (Khan ,2012) (Zuhr, 1986).

It is a well-established fact that different age groups have different temperaments thus, they have different physiology and pathology of the body. Also, the existences of *Quwa* in different age groups are different. But till date, the concepts described by Unani literatures are based on merely observation. The objective of this study is to evaluate *Quwat-e-Haywaniyah* by measuring either through force of contraction of heart or through Pulse. Pulse Pressure represents the force that heart generates each time it contracts and it can be related to *Quwat-e-Haywaniyah* and it is the difference between the systolic and diastolic pressure readings.

II. METHODS

This study was carried out in Ajmal Khan Tibbiya College, Aligarh Muslim University, Aligarh from the year 2015-2016.

2.1 Selection of volunteers

In this study, 205 healthy male and female volunteers were taken. Among them, 25 subjects dropped out for not fulfilling the inclusion criteria. The volunteer of first age group i.e from 10-25 years old were taken from school going children and the volunteers of second age group i.e. 25-40 years were selected from different residence in the campus of Aligarh Muslim University Aligarh, preference was given to students residing in hostels because their environment and nutritional status remain almost static and constant. And the volunteers of third age group i.e. 40-60 years were taken from the employees of Aligarh Muslim University so as to maintain the homogeneity among the volunteers of individual group.

The study was approved by Institutional Ethics Committee (IEC) of Ajmal Khan Tibbiya College, A.M.U, Aligarh and was initiated with the written consent of the subjects duly taken. The health fitness examination of the participants was done by researchers. The participants who were normal, healthy with no background of any arterial diseases, diabetes mellitus and hypertension heavy exercise were selected for study and those suffering from hypertension, diabetes mellitus, condition affecting QRS complex and individuals from *sin-e-shaikhukhat* were excluded from our study.

The 180 individuals were randomized and categorize for different age groups. Among them 60 volunteers were in group A, 60 in group B and 60 in group C.

2.2 Categorization of Individuals

Selected volunteers were divided into four age Groups according to Unani classification of *Asnan-e-Arba*. Group A or *Sin-e-Namu* which includes individuals of age 10-25 yrs, Group B or *Sin-e-Shabab* which includes individuals of age 25-40 yrs , Group C or *Sin-e-Kahulat* which includes individuals of age 40-60 yrs and Group D or *Sin-e-Shaikhukhat* which includes volunteers above 60 yrs of age. Group D was excluded from the study because these volunteers were not healthy enough to be included in this study. Therefore only Group A, Group B and Group C were included in this study.

2.3 Pulse Pressure assessment

All experiments were conducted in a quiet laboratory with minimum of distractions. This research paper is based on non-invasive measurements. The first part of research was designed for the assessment of *mizaj* on

the basis of *Ajnas-e-ashra* (ten determinants) and a proforma (Annexure 1 & 2) was used to measure height, body weight, blood pressure and other relevant information of every subject. Sphygmomanometer is used to record blood pressure and Pulse pressure is calculated by measuring the difference between systolic and diastolic blood pressure. In the second part of research, the results from the designed system were recorded, compared in different age groups, validated and depicted in the form of tables and graphs. Finally, a discussion of the results and future directions will be presented.

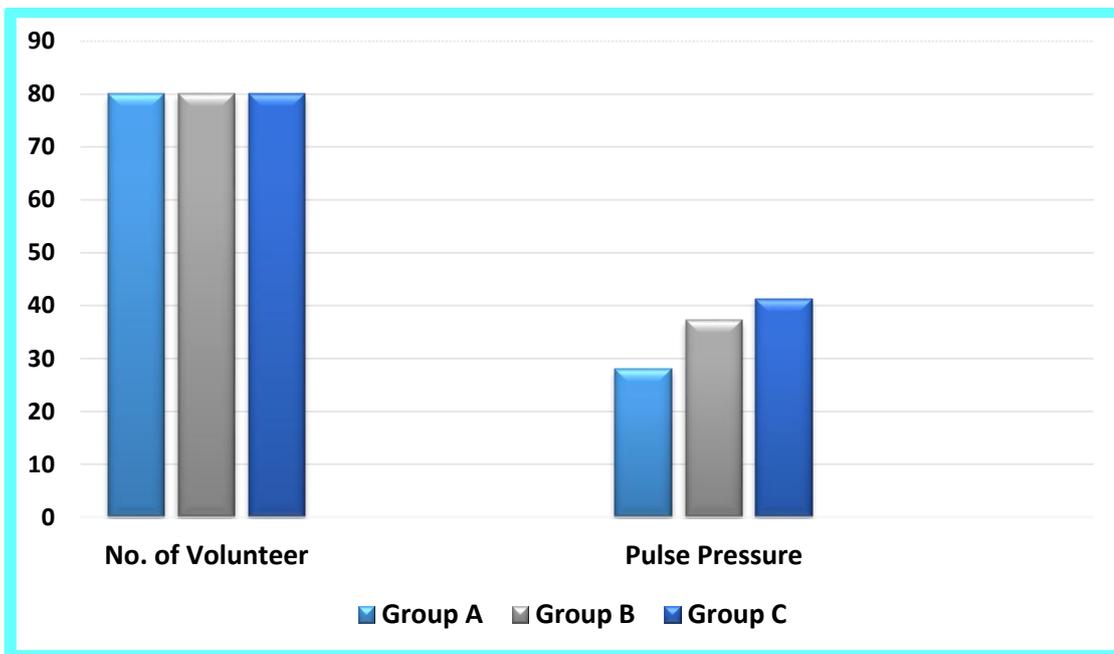
III. OBSERVATIONS AND RESULTS

The mean and standard deviation of Pulse Pressure of Group A, B and C subjects were calculated. It was revealed after this study that the mean of Pulse Pressure Group A was 28.1 with the standard deviation of 6.36. The mean Pulse Pressure of Group B was 37.2 with the standard deviation of 5.28 and mean Pulse Pressure of Group C was 41.31 with the standard deviation of 5.54 shown in Table-01, Graph-01.

Table-01
Pulse Pressure of volunteers according to their age groups

<i>Category</i>	<i>No. of volunteers</i>	<i>Pulse pressure</i>
<i>Group A</i>	60	28.1 ± 6.36
<i>Group B</i>	60	37.2 ± 5.28
<i>Group C</i>	60	41.31 ± 5.54
<i>Total</i>	180	

Graph -01



Statistical Analysis

ANOVA (one way analysis of variance) is applied to find out the significance between all three Groups i.e. Group A, Group B and Group C and result is found to be highly significant.(Table-02)

Table -02

<i>Parameters</i>	<i>Group</i>	<i>Number of Volunteers</i>	<i>Mean ± S.D</i>	<i>Significance</i>
<i>Pulse Pressure</i>	Group A	60	28.1 ± 6.36	F = 87.4 P<0.000
	Group B	60	37.2 ± 5.28	
	Group C	60	41.31 ± 5.54	

*Significance at the level of p< 0. 05

Table- 03

Comparison of Pulse Pressure between Groups

Comparison	Significance

Group A & Group B	Significant(P<0.0001)
Group B & Group C	Significant (P<0.0001)
Group C & Group A	Significant (P<0.0001)

Significance at the level of $p < 0.05$

The unpaired t-test was applied to test the significance of the results and it was found that the difference of Pulse Pressure of Group A and B was significant ($P < 0.0001$). When Pulse Pressure of Group B and C was compared, the results was found to be significant ($P < 0.0001$). When Pulse Pressure of Group C and A was compared, the results was also found to be significant ($P < 0.0001$).

IV. DISCUSSION

It was revealed after this study that the mean Pulse Pressure of Group A, B & C was 28.1, 37.2, and 41.31 with the standard deviation of 6.36, 5.28 and 5.54 respectively. In this way, it can be said that the average Pulse Pressure of Group A is lesser than that of Group B & C. Group C volunteers had highest value of Pulse Pressure because *mizaj* of *Sin-e-Kahulat* is cold and dry and Unani physicians were of the opinion that coldness causes narrowing in *urooq* which led to decrease in function of *Quwat-e-Haywaniyah* and an old heart cannot speed up as quickly or pump blood as fast as much as or as much blood as a younger heart. Hence Pulse Pressure increases as a person ages and *Quwat-e-Haywaniyah* decreases vice versa (Saleem ,2017).

The study shows results to be highly significant because there is difference in *mizaj*, *function* and *Quwa* of the body in different ages of life. There is an increase in amount of *ratubat-e-garibah* which weakens the functions of the individual. With advancing age *hararate-ghariziyah* decreases resulting in relative *baroodat* in *mizaj*. The *baroodat* in *mizaj* weakens the *quwa* which ultimately weaken the functions because *quwa* requires *hararat* for performing *af'al* (Rashid ,2015)(Saleem, 2018).

V. CONCLUSION

There were variations between the three age groups which were almost in concordance with the statements of Unani physician *Quwat* is not eternal, it decreases gradually with age. In old age since there is decline in this real heat (*hararate ghariziyah*) and also, heart and blood vessels become stiffer. The heart fills with blood more slowly. The stiffer arteries are less able to expand when more blood is pumped through them. An older heart cannot speed up as quickly or pump as fast or as much blood as a younger heart there occurs constriction of *urooq* (narrowing of the arteries), thus hampers the normal functions of cardio-vascular system

VI. ACKNOWLEDGMENTS

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