International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

Sex Variations of Serum Albumin Level between 20-50 Adulate Aged in Kabul City Afghanistan

Wasima Shaifi

Assistant Professor, Faculty of Allied Health, Department of Biochemistry, Kabul Medical Science University (Abo Ali Ibne Sina)

Abstract: ***Albumin is the most abundant plasma protein and acts as a transporter for many substances, such as calcium and some drugs, while also having an important role in maintaining oncotic pressure. Serum albumin concentration is used in the monitoring of renal and liver disease. For the correct interpretation of the results of laboratory tests, it is necessary to consider the extent of its normal value, however, the normal level of serum albumin is clear in other countries, but in Afghanistan, there has not been issue a comprehensive research in this regard. The objectives of this research are to estimate the average value of serum albumin in adults and its difference compare it between male and female genders. The research method isa descriptive, cross sectional study in which secondary data of blood albumin of 462 adults was studied; Data were obtained from French Medical Institute Center (FMIC) of Kabul, biochemistry lab. That was done by fully automate dimension machine. The data was analyzed by using SPSS 20 software. Results are shown that average of serum albumin (mean ± SE) in all persons was 4.01 g/dl ± (0.04) that minimum rate was 3.00 g/dl and maximum rate is 5.40 g/dl. Average blood albumin in male was 4.10 g/dl ± (0.07) that minimum rate was 3.00 g/dl and maximum rate is 5.40 g/dl but in woman's the average blood albumin was 3.94 g/dl ±(0.05) that minimum rate was 3.20 g/dl and maximum rate is 5.20 g/dl which is shown significant difference. It is concluded that the blood albumin of men is higher than women.***

Keywords: Proteins, Amino acids, Classification of protein, Albumin synthesis, Albumin Formation

1. Introduction

Albumin is one of the most important proteins of plasma which is the carrier of many substances in the body such as calcium and some drugs. It has a vital role in maintaining oncotic pressure as well. Serum albumin concentration is used in many cases such as, an indicator of kidney and renal diseases, assessment of toxicity risk as a result of unconjugated bilirubin (hyperbilirubinemia) and some albumin bound drugs and likewise for determination of albumin serum recommended for hemodialysis patients.[3, 5, 10)]

Albumin was introduced in 1941 for clinical application and then it was extended further. In 1999 Japan Health Ministry considered albumin for the safety of inflammation and shocks produced for the lack of body fluid compulsory. [10]

The use of blood albumin is essential in the following cases: Cirrhosis of the liver, intestinal bacteria such as Klebsiella and Escherichia-coli, shocks related to bleeding, liver disorders, burns, nephrotic syndrome, liver and kidney syndromes.[3] It should be mentioned that in our country Afghanistan, no extensive research has been conducted in this regard so far.

The main purpose of this research is the study of the serum albumin level in healthy elderly people considering their gender.

The research that has been conducted by a scientist named Weaving and his colleagues regarding data collected on blood albumin due to age and gender indicate the average level of blood albumin in females is 3, 94 g/dl and the average blood albumin level for the males is 4, 10 g/dl. Likewise, the research indicates that the average level of blood albumin is increased in people under the age of twenty and again enhanced due to age increase. [1, 4, 9]

The effect of age on protein synthesis was studied by an American scientist Anna and his fellow researchers on 36 healthy men and women at 20-43 and 63-79 age limits for three rounds and demonstrated that till the age of 40 the concentration of blood albumin has little difference, but after the age of 40 the blood albumin concentration in males is higher than the females. [1, 2, 4]

In 1992, a research had been conducted by a scientist named Salive and his fellow workers on albumin of blood in Australia. This research was done using Cross-Sectional Study on 4115 persons that were at the age of 70 and over considering age and gender. This study indicated that the albumin average in elderly people was registered less in men with the age limits of 71-74 was 4,0 g/dl and in men aged 90 was 3.8 g/dl.[7]

Likewise, in women aged equivalent to men was obtained with little difference, that is, 3.8 g/dl and 3.5 g/dl. This study shows that low albumin level has a correlation with anemia or blood deficiency. Likewise, the people with higher ages and smoked more than one packet of cigarette a day had a blood albumin level of 0.4 g/dl which is lower than the others. [6]

The research which was carried out in 2005 using Cohort by experts and researchers of nutrition of America on blood albumin aimed at linkage study of blood albumin concentration with mass of bone and muscles of people of advanced years. The individuals considered in this research included 1882 dark-skinned and white-skinned men and women. The mentioned researchers observed changes in the mass of joints and free lipid mass of their bodies using X-ray absorption apparatus. This five year period included style of life, protein diet intake and inflammation in their bodies. In conclusion, 21.2 % of the participants of research had a lower albumin concentration that is 3.8 g/dl. In addition to this, the research showed that

due to weight change also the ones with lower albumin concentration (3.8 g /dl) the same condition are applied. And the relation of albumin concentration with free lipid mass was not that much. The concentration of albumin decreases with joints mass and this low-level is a danger indicator for the decrease of white blood cells. [8]

Another research has been conducted by a Japanese researcher in Gifu city of Japan on blood albumin concentration using Cross-Sectional Method during the years of (1999-2003) on 23 men and 41 women aged 65 and over. The persons on whom the research was applied were the members of Japan Gifu Health Center. They all lived by themselves and referred to the said center once a year. Blood albumin of these people was tested by the researchers and it was observed that each year their blood albumin level was lower due to their age. As the average level in men aged 65-69 in the first year was 4.3 g/dl and in women aged 90 and over their blood albumin level was 4.0-4.3 g/dl and was decreasing. The percentage of blood albumin level in men aged 65-69 was 1. 2 % and the ones aged 85-89 was 6.6 % and in women with the same age 0.6 and 4.1 % was obtained. Likewise, their Regression Analysis in men = - 0.716 and in difference of albumin 0.015 g/dl in each year and in women r = - 0.794 and difference in albumin each year was recorded. The difference in albumin in each year was higher due to age and P<0.05 registered and the serum albumin of men was higher than women. [2, 4]

2. Materials and Method

The research on serum albumin level has been conducted considering gender using Cross- Sectional Study and Descriptive Method. The data has been collected as a secondary data as a result of laboratory tests on 1500 normal and abnormal persons in total, collected from hospital with the aid of automatic Dimension Device. From 462 apparently healthy persons were under observational study. Likewise the age of the blood donors were between 20 and 50.

The scientific equipment used in this research was comprised of automatic dimension apparatus, micropipettes, test tubes, test tubes rag, Syringes, sphygmomanometer with precise stethoscope, weight determination balance, gloves and face masks, waterproof markers for numbering tubes, centrifuge, minus two minus eight temperature refrigerator for storing albumin kits and other reagents. In this research we have taken advantage of SPSS. 20 Program for calculations and result presentation and also Significant level = 0, 05 were chosen.

3. Results

This research that was on serum albumin level in the normal condition due to gender was performed in French Hospital in Kabul through Cross Sectional and Descriptive Method considering all 462 persons under study comprised of 240 women and 222 men.

The blood samples of the 462 individuals under research were collected from people aged between 20 and 50. Blood serum albumin frequency of the 462 persons in this research was orderly and the average blood serum albumin in all the individuals under study was 4.01 g/dl ± (0.044) of which the minimum level was 3.00 g/dl and the maximum was 5.40 g/dl. The albumin inside the normal limit was recorded 2-5.5g/dl. The males and females each for obtaining blood serum albumin level due to gender was classified into two categories. Group one was in total of 240 persons which consists of (51.98 %) females with average age of 33, 79 and blood serum albumin level 3. 94 g/dl. The second group was 222 males (48.05%) with the average age of 33.88 and average of blood serum albumin 4. 10 g/dl. (Table 1 and figure 1).

Table 1: Number, percentage, average age and blood serum albumin level for men and women aged 20-50 year.

Blood albumin of males and females aged 20-50							
Gender	Number	Percentage	Age average	Albumin average		± SE	Exact. Sig.
Females age 20-50	240	51.98	33.79	3.94		0.05	
Males age 20-50	222	48.05	33.88	4.10		0.07	0,0001

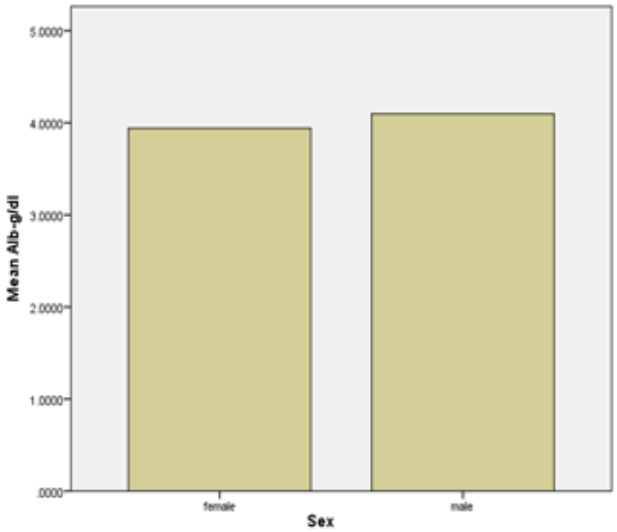

Figure 1: Blood serum albumin level of the males aged 20-50 and females aged 20-50 P<0. 05

Figure (1) indicates that blood serum albumin concentration of female aged 20-50 was 3.94 g/dl and the blood serum albumin concentration of male aged 20-50 was 4.10 g/dl. According to the statistical analysis which was obtained by SPSS (T-Test) P value = 0, 0001.

The result indicated that the difference was statistically was considerable and significant. As there is a difference in the average of male blood serum albumin and the female blood serum albumin and the blood serum albumin of the females is lower than of the males.

Table 2: Total blood albumin average and the minimum and maximum levels in 462 females and males of which and 240 were females and 222 males aged 20-50.

Concentration of blood serum albumin (g/dl)			
Feature	Females	Males	All observation
Number of sample	240	222	462
Minimum level	3.20	3.00	3.00
Maximum level	5.20	5.40	5.40
average	3.94	4.10	4.01
±SE	0.05	0.07	0.04

Table (2). Indicates the result in general, that in 462 persons under research the average of blood albumin in all the individuals under study was 4.01 g/dl ± (0.044) with the minimum of 3.00 g/dl and maximum level of 5.40 g/dl. That is the albumin level inside the normal limits was (2-5 g/dl) with P Value = 0.0001. In conclusion, the blood albumin concentration of males was higher than of the females.

4. Discussion

In order to determine the difference of blood serum albumin in females and males, we have classified them into two categories: The first group was the women aged 20-50 with the total number of 240 persons. The second group was the men aged 20-50 with the total number of 222. According to our estimates and calculations the percentage of group one and group two were approximately equal, that is, the percentage of group one was 51.98 and group two was 48.05. For the comparison of these two groups we have used specific statistical formulas and we have taken the number of samples into consideration as well. Likewise, the age average in group one was 33, 79 and in group two was 33.88 and the blood albumin concentration of the first group is somewhat different than group two. The concentration of blood serum albumin in group one was 3.94 g/dl and of the group two was 4.10 g/dl. On the whole, we can judge that the protein catabolism due to body surface in males is somewhat higher than of females. As the research conducted in the United States of America and Japan has reported the same data. [2, 4]

The research conducted in England, Japan, America and Australia also indicates that the blood serum albumin level of the males is higher than females because of the muscles mass and also taking excess protein substances stimulate synthesis in the liver and it has been reported higher. [2, 8, 9, 10]

The catabolism of the proteins is rather higher in males than in females because the physical activities in males is higher than females and likewise the muscles mass of men is more than women, therefore albumin synthesis is different in men than women and there is a hormone difference in the organism of men and women.[8, 10]

Taking into consideration of the above-mentioned items the research proves that in Kabul city that the albumin level of blood serum in men is higher than women and corresponds with the reliable literature. According to the studies and research conducted in various countries of the world, albumin high level consider due to renal and liver disorders and other metabolic diseases. Urinal stones and intestine bleeding or other physiological cases such intake of excess protein diets and likewise the genetic difference which is due to the inheritance of enzymes has also been mentioned. [8, 10]

Acknowledgements

The authors are thankful to her Husband Professor Dr. Sharifi Kabul University, Faculty of Agriculture, Agronomy department for prepared different facility during the research and thankful to Professor Dr. Danish, Kabul Medical Science University (Abo Ali IbneSina), Pharmacology department for his valuable advice, as well as thankful to Dr. Shabnam.azizi and Dr. Sediq, Franch Medical Institute Center (FMIC) of Kabul for their cooperation regarding data collection.

References

[1] Ancion, A., Sophie, A., Cecile, O., Anne, G., Luc, P., Patrizio, L. (2017). Serum albumin Level and hospital mortality in acute non - ischemic heart failure. Wiley online library, 4: (pp. 138-145). (wileyonlinelibrary.com)DOI: 10. 1002/ ehf2 . 12128, 138-145.

[2] Anna, E., Craig, A., Kevin, E., Nadine, S., & Wayne, W. (2014). Nutrient Ingestion, Protine Intake, and Sex, but Not Age, Affect the Albumin Synthesis Rate in Humans. Jounal of Nutr. , 137(7): (pp. 1734-1740). https://www.ncbi.nlm.gov/pmc/aarticls/PMC 388587 doi: 10.1093/jn/136.7.1734.

[3] Bachmann, L. M., Min, Y., James, C. B., David, E. B. (2017). State of Harmonization of 24 Serum Albumin Measuremet Procedures and Implications for Medical Decsions. General Clinical Chemistry. (pp. 770-779) http:// cholarscompass.vcu.edu/path-pubs/13. DOI: 10. 1373/clinchem. 2016. 262899.

[4] Gomi, I., Hideki, F., Makoto, S., Yoshiyuki, M., Takashi, A., Kuniyuki, T., & Hisataka, M. (2007). Relationshep between Serum Albumin Level and

Aging in Community- Dwelling - Supported ElderlyPapulation. Journal Sci. Vitaminal, Vol. 53: (pp. 37-32). https://doi.org/10.3177/jnsv.53.37.

[5] Infusino, I., Mauro, P. (2013). Serum Albumin: Accuracy and Clinical use. Clinica Chimica Acta, (pp. 15-18) http:// dx.doi.org/10.1016/j.cca.2013.01.005.

[6] Ng, T., Lei, F., Mathew, N., & Keng, B. (2008). Albumin, Haemoglobin, BMI and Cognitive Performance in Older Adults. Age and Ageing, 37(4): (pp. 423-429). https://doi.org/10.1093/ageing/afn102.

[7] Salive, M., Cornoni, H., Phillips, C., Guralik, J., Cohen, H., Ostfeld, A., & Wallace, R. (1992). Serum Albumin in Older persons: Relationship with Age and Health status. JClin Epidemiol, 45 (3): (pp. 1-21). https:// www. ncbi. nlm. nih. gov/ pubmed/ 15694.

[8] Visser, M., Stephen, B., Anne, B., Bret, H., Frances, A., Michael, C., & Tamara, B. (2005). Lower SerumAlbumin Concentration and Change in Muscle Mass: the Health, Aging and Body Composition Study. American Society for Clinical Nutrition, 82: (pp. 531-537). https://academic. oup.com/agcn/article-abstruct /82/3/531/4862957.

[9] Weaving, G., Gifford, F., & Richard, G. (2015). Age and Sex Variation in Serum Albumin Concentrtion: an Observational Study. Annals of Clinical Biochemistry, 53(1): (pp. 106-111). DOI: 10.1177/0004563215593561.

[10] Yasumura, S., Shigeyoshi, M., Masanori, M., Takehiro, K., Shuichi, K., Asashi, T., Tadashi, M. (2017). Evidence-based Guidelines for the Use of Albumin Products Japan Society of Transfusion Medicine and Cell Therapy. Japanese J. of Transfusion and Cell Therapy, 63(5): (pp. 641-663). http://doi.org/10.3925/jjtc.63.641