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Comparative study of certain Biochemistry parameters of serum constituents with reference to age

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Abstract: The objective of the current study was to explore the various serum biochemical parameters in people with different ages. When compared to the young age group, biochemical investigation of some instances showed a substantial increase in blood glucose and albumin in the Top aged group as well as a significant drop in total protein and creatinine concentrations. Compared to the young age group, the medium group also had non-significantly higher levels of triglycerides, cholesterol, uric acid, alkaline phosphatase, and creatinine. The list of organic constituents also included triglycerides, glucose, fructose, uric acid, creatinine, urea, total protein, albumin, and cholesterol. Alkaline phosphatase and other metabolic enzymes were quantified. Although not clinically significant increased blood urea nitrogen and creatinine levels were seen in the majority which may have been caused by urinary contamination of the antegrade specimens. Diabetic individuals had considerably higher levels of glucose than age-related levels of albumin and alkaline phosphatase. Additionally, the levels of glucose, uric acid, and all inorganic components were approaching their corresponding levels in serum. It is concluded that certain biochemical parameters variations that are linked to a few blood parameter changes may be helpful in the diagnosis of individuals who belong to certain age groups.

Keywords: Plasma, Serum, Bio-Chemistry Analyzer BA-88A, Biochemical parameters, Age

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Introduction

There exists some studies which demonstrated that age and sex-related individuals exhibit quantitative serum analysis characteristics (Higgins *et al.,* 2019). Investigations into

normative data for various age and sex-variable populations have focused on the concentration of biochemical components in serum/plasma. Three groups, including Top age, Middle age, and Younger age groupings, were experimentally divided. Due to age-related issues, biochemical abnormalities should be taken into consideration as one of the many causes of anomalies in varied populations (Khan *et al.,* 2011). The present study was performed to analyze and evaluate the biochemical properties of diverse biochemical components from volunteers across a range of ages.

An investigation of the biochemistry of plasma or serum and hematology can reveal crucial details about the community under study as well as the individuals involved. In field studies, especially, the ability to gauge a subject's health at the time of the examination can be a crucial tool for gathering information and developing a treatment strategy (Mahaffey, 2003; El-Deeb and Younis, 2009). Because of the diversity that can result from species individuality, season, sex, age, temperature, nutritional and reproductive state, and captivity status, these parameters must be viewed as guides rather than absolutes (Lotfollahzadeh *et al.,*2011). Results may also be impacted by sample handling, analysis methodology, and sampling procedure. The Bio-Chemistry Analyzer BA-88A has become widely used in human medicine and is a useful instrument for evaluating health. They come with a number of advantages, including as mobility, a small volume, quick results, direct control over the sample, and quality control.

For this study, the samples were collected from the teaching, non- teaching staff and students who volunteered for the analysis. After collection and analysis of the samples, we have classified them into three groups (above 40 years, between 35-40 years and between 20-25 years) based on the age.

Materials and Methods

Age-specific blood samples (10 samples T1-T10 from above 40 years, 10 samples M1-M10 from 35-40 years and 10 samples Y1-Y10 from 20-25 years age) were collected. The estimation of various blood parameters were performed.

Blood collection:

Venous blood was drawn in a sterile tube, labelled with the patient's name, identification number, and the date of collection, and drawn in 5 ml increments for adults and 1 ml for and younger subjects. Sterile (unopened) 5 ml Vacutainer Serum Separator Tubes with Clot Activator (SST; Becton Dickinson) and 4.5 ml Vacutainer Plasma Separator Tubes (PST; Becton Dickinson) with 15-20 IU/ml lithium heparin were used. Samples were collected and left to stand at room temperature (25 °C) for 0.5 h before being centrifuged (Remi 10000rpm for 5 min). Whole blood was refrigerated and kept at 4–8°C for up to 24 h before the serum is separated. The Institutional Management authorized the exploratory proposal as a service basis. After explaining the purpose of the study to each subject, their agreement was sought.

Blood parameters:

Albumin, alkaline phosphatase (ALK), aspartate aminotransferase (AST), calcium, total cholesterol, creatinine, creatine kinase (CK), Triglycerides (TGL) glucose, Random Blood Sugar (RBS), total protein, uric acid, and urea were measured with the Bio-Chemistry Analyzer BA-88A. We used Remi-10,000 rpm Centrifuge, auto rotated machine, micropipettes,

Results

From the data of the 30 different age group samples collected and analyzed, younger groups showed much lower levels of the biochemical components than did middle-aged individuals. High levels of RBS, cholesterols and TGL were observed in the adult group. Figure 1 shows the plasma biochemical parameters in the top aged adults. In this study there is significant ($P<0.05$) variations in the plasma concentrations of RBS, albumin, urea, cholesterol, and triglycerides. Some individuals with a genetic susceptibility to diabetes and those under work-related stress

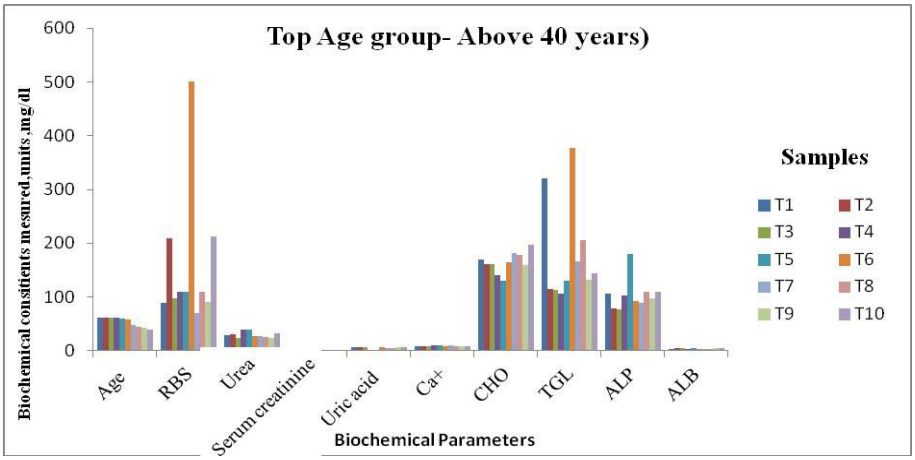

Fig. 1: Blood parameters in group I (above 40 years age group).

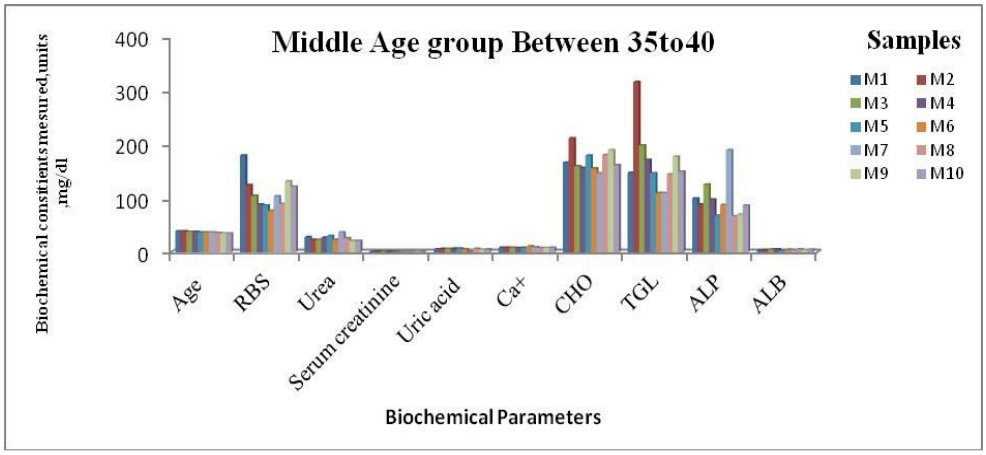

Fig. 2: Blood parameters in group II (between 35-40 years age group).

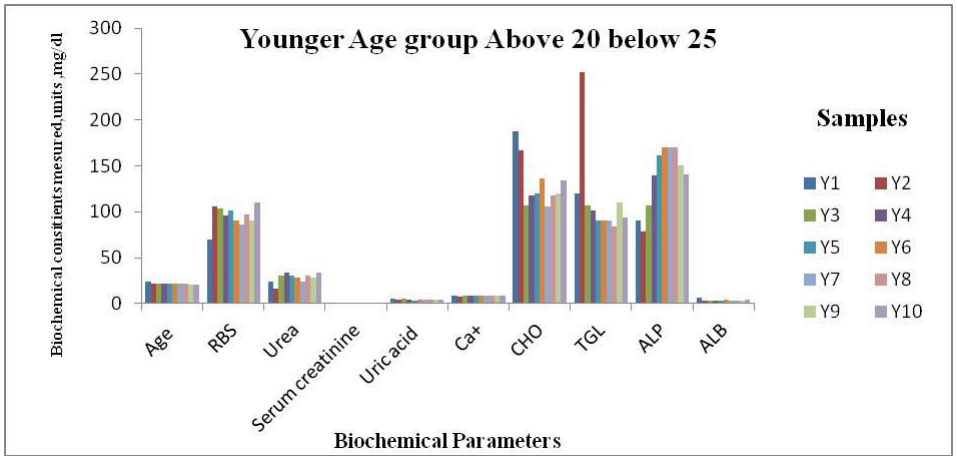

Fig. 3: Blood parameters in group III (between 20-25 years age group).

showed some elevated RBS levels. The remaining values, such as urea, triglycerides, ALP, ALB, serum creatinine, and uric acid, are within normal ranges when compared to T2, T6, and T10 samples. Age-related changes have little impact on most values.

Figure 2 shows blood parameters in age range of 35 to 40 All of the parameters (sugar, RBS, urea, triglycerides, ALP, ALB, serum creatinine, and uric acid) are normal. As a result, this group not exhibited any abnormal results. Subjects between the ages of 20 and 25 are generally quite active, with the exception of a small number of individuals, in these subjects the blood parameters (sugar, urea, RBS, triglycerides, ALP, ALB, serum creatinine, and uric acid) are normal (Fig. 3) .

Discussion

An essential component of the clinical laboratory diagnostic tools accessible to clinical pathologists to evaluate health and illness in both human and animal species is the assessment of blood biochemical parameters (Johnston *et al.,* 2007). Three age groups are examined in this study for various biochemical markers (Kakizoe *et al.,* 2007). Our findings show aberrant values in a small number of carefully chosen individuals associated with changes in a few plasma biochemical markers. The present study's biochemical analysis revealed significant changes in the concentration of RBS as well as other biochemical parameters when comparing various age and sex variable groups (Johnston *et al.,* 2007).

In the current study, participants in aged groups had higher and lower quantities of plasma sugar, urea, creatinine, cholesterol, triglycerides, and albumin. Although the drop in albumin concentration was only statistically significant ($P< 0.05$) (Johnston *et al*., 2007). The considerable drop in plasma albumin concentration could be the result of decreased synthesis by liver. Furthermore, a drop in plasma albumin concentration during theileriosis may be responsible for hypoproteinaemia. Proteinaceous fluids accumulate extravascularly as a result of sick lymph nodes (Nazifi *et al.,* 2008). The considerable increase in bilirubin and urea levels in older adults is consistent with previously published data. The elevated serum bilirubin concentration associated with human diseases may be caused by a number of factors, including the hemolysis of parasitized erythrocytes in the reticuloendothelial system and lymph nodes, hepatic dysfunction, and hemolytic anaemia. A dramatic rise in urea levels could be caused by Theileria infection-related anorexia, renal injury, or an increase in protein catabolism (Omer *et al.,* 2002, 2003). The results are somewhat consistent with a non-significant fall in the infected group's creatinine concentration in the current investigation. Omer *et al.* (2002) demonstrated a considerable drop in human creatinine content which developed numerous alleged health issues, including muscle soreness. Theileriosis in people did not significantly affect the mean uric acid values during joint inflammation (Loh *et al.,* 2014). One of the most common clinical laboratory procedures is the use of enzyme tests to diagnose illnesses. In the current investigation, it was discovered that human ill and borderline populations had higher levels of ALP and ALB.

Conclusion

In conclusion, we found that various blood biochemical components were affected by age-related issues in people, which, when considered collectively, may reflect tissue damage and aid in better understanding the pathophysiology of the disease. This study led to the conclusion that the diagnosis and prognosis of age-related disorders in humans may benefit from the measurement of biochemical parameters.

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