**SPASCIT 13**

**THE EFFECT OF ABO BLOOD GROUP CLASSIFCATIONS ON ANTIOXIDANT BIOMARKERS OF HEALTHY ADULTS**

# ABSTRACT

**Background:** There are lots of indications that ABO blood types play a key role in the susceptibility or resiliency of humans to several infectious and non-infectious health deviations. This research work was aimed at assessing the effect of ABO blood types on antioxidant markers in healthy adult participants.

**Materials and Methods:** A total of seventy (n=70) adult of both sexes were recruited into the study. All participants were assumed healthy provided they have not been on medication for a period of two weeks prior to their recruitment. Anthropometric parameters, body mass index (BMI) and antioxidant markers of the participants were assessed in the study. Antioxidant markers assessed includes superoxide dismutase (SOD), glutathione-S-transferase (GST), and reduced glutathione (GSH). Data analysis was done using SPSS version 22.0.0.0. The level of significance was set at p<0.05. **Result:** Blood group O has the highest blood type frequency of 42 %, while AB has the lowest frequency of 12.9 %. A significant positive correlation was observed between body weight and BMI. The activity of GST and GSH antioxidant markers increased significantly (p< 0.05) among the blood types. **Conclusion:** This study concludes thatthe effects of the ABO blood groups confer more discrepancies in the antioxidant activity of GST and SOD. The participants with blood group A were of a good health advantage and less susceptible to oxidative stress.

**Keywords:** Antioxidant markers, ABO blood groups and xidant markers, clarify sed in the healthy adult.

**1.0 INTRODUCTION**

Blood groups refer to any variation or polymorphism detected in the blood. However, the term blood group is usually restricted to blood cell surface antigens, and generally to red cell surface antigens1. Dean (2005) explained that blood group classification is based on the availability and in-availability of antibodies and inherited antigenic factors on the external portion of the red blood cells. Certain differences observed in the different types of blood are as a result of various protein types found at the outermost part of the red blood cells referred to as A and B antigens2. The ABO blood type structure is a highly essential system and the most important for blood type compatibility. The molecular basis of the blood type system was fully explained in the year 1990. The ABO molecules represent complex membrane antigens that are widely produced at the external portion of the Red Blood Cells (RBC) and also, other cells showing how more clinically relevant the ABO system is beyond blood transfusion2. This system of blood typing is genetically formed and it is usually ascertained by the genes present on the ABO locus on chromosome 9 (9q34.1). ABO blood structure exhibits the production of two major carbohydrate antigens (A and B) usually produced on the membrane of the red blood cell and in numerous other tissues, two plasmatic antibodies (anti-A and anti-B) also3. The blood type A and B genes codes to functional glycosyltransferases that has ability to convert the forerunner H antigen to A or B antigens. Blood group O gene usually codes to an atypical glycosyltransferase that does not have the ability of modifying the H antigen4. In entities that exhibit the secretor phenotype. However, ABO blood group may have additional consequences 5. Researches have revealed that particular blood types determine tendencies toward physical or psychiatric illnesses 6. There are accumulating pieces of evidence about ABO blood antigens playing a crucial role in several man’s health deviation and that a specific blood group have the ability to add to extend life through biological mechanisms that are essential for escaping or eluding serious disease 2. The connection between Blood types and disease occurrence is a function of bigger amplitude but, only a very few researches have been done in this area 7. However, ABO blood group may have additional consequences 5.

This research was aimed at finding out the connection amid the ABO blood groups with antioxidant biomarkers. It is very possible for an individual to change his or her workouts and diet, but nothing can be done to change that entity’s blood kind as this is ascertained via the microscopic substances that are inherited from parents. These substances are present on the external portion of red blood cells. These microscopic substances relate with our immune system such that it alters our susceptibility to a number of common diseases. Therefore, the susceptibility of a person to diseases such as heart trouble, cancer, and several others is absolutely dependent on the type of blood type (A, B, AB, or O) he or she belongs.

**2.0 MATERIALS AND METHODS**

### 2.1 SUBJECTS INCLUSION CRITERIA

### Grownup males and females between the ages of 18 to 45 years old, who have not been on any medication in the past two weeks prior to blood collection and willingly gave consent to be part of the research work were included in the work.

### SUBJECTS EXCLUSION CRITERIA

Adults above the age of 45 years, children and teenagers were excluded from the research.

Adults within the research age categories who are either on medication or unwilling to participate in the research were also excluded from the study.

PARTICIPANTS’ BLOOD COLLECTION

Blood samples were obtained by venipuncture using va­cutainers with heparin as anticoagulant. After gathering, it was instantly closed and retained in ice to prevent lysis. The samples were re­frigerated and immediately transported to the laboratory. The vacuum blood gathering tube was instantly centrifuged at 3000rpm for 10 minutes at room temperature. The sample plasma was aliquoted into labeled Eppendorf tubes and stored at -80⁰C. The plasma was used to quantify biochemical, antioxidant and lipid markers in the blood.

**ANTIOXIDANT ASSAYS**

These antioxidant enzymes undertakings were ascertained spectrometrically the research result information are represented as mean ± standard error of mean (S.E.M). Statistically noteworthy dissimilarities in mean values were tested by one way analysis of variance (ANOVA). The data are analyzed using Statistical Array for Social Sciences 22.0.0.0 (SPSS Inc. 2014) and Microsoft Excel 2016 version. The dissimilarities were deliberated significant when p<0.005.

**3.0 RESULTS**

##### **Table 1: Effect of blood group classification on anthropometric parameters.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| BLOOD GROUPS | FREQUENCY OF OCCURENCE | PERCENTAGE (%) FREQUENCY | WEIGHT (Kg) | HEIGHT (m) | BMI (K/m2) |
| O | 30 | 42 | 67.43±1.5 | 1.67±0.1 | 25.39±1.5 |
| A | 11 | 15 | 74.09±5.4 | 1.67±0.1 | 27.14±2.0 |
| B | 20 | 28 | 70.62±3.4 | 1.64±0.1 | 27.38±2.0 |
| AB | 8 | 15 | 65.12±8.0 | 1.58±0.1 | 28.65±7.1 |

The values are expressed as mean±standard error of mean (SEM).

##### **Table 2: Effect of blood group classification on antioxidant parameters.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  Groups | O | A | B | AB |
| Frequency | 30 | 11 | 20 | 11 |
| SODx10-6 (U/mg protein) | 48.24±1.2a | 14.24±4.0b | 21.13±5.0b | 12.39±2.0b |
| GSTx10-3 (U/mg protein) | 35.25±4.4b | 135.20±33.5a | 59.40±32.6b | 54.73±17.3b |
| GSHx10-4 (U/mg protein) | 129.6±8.4a | 214.86±53.6b | 173.90±30.1a | 177.23±13.1a |
| TBARS x10-4 (micromol/l) | 251.32±38.2b  | 82.80±4.16a | 254.49±48.7b | 141.83±75.1a |

The values were represented as mean±standard error of mean (SEM). GSH, SOD, GST, TBARS represents reduced glutathione, superoxide dismutase, glutathione-S-transferase, and thiobarbituric reactive substances. Superscript a ‘a’ and b ‘b’ indicates values that are significantly (p<0.05) different from each other.

## **3.1 CORRELATIONS AMONG PARAMETERS WITH ANTHROPOMETRIC FACTORS**

The table 1.2 shows that there was strong negative correlation among the ABO groups for weight and height in body mass index, also a negative correlation is seen between urea and weight among the ABO blood groups. Correlation is seen between super oxide dismutase and height among the ABO blood groups.

##### **~~TABLE 1.2:~~CORRELATIONS WITH ANTROPOMETRIC FACTORS**

|  |  |  |  |
| --- | --- | --- | --- |
|  | WEIGHT | HEIGHT | BMI |
| BMI (k/m2) | 0.460\*\* | -0.714\*\* | \_ |
| UREA (mg/dl) | 0.292\* | \_ | \_ |
| SOD (U/mg protein) | \_ | 0.238\* | \_ |

**\***Correlation is significant at the 0.05 level (2 tailed)

\*\*Corellation is significant at the 0.001 level (2tailed)

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# DISCUSSION

There are much proves that the ABO blood types possesses a responsibility in the defenselessness or resistance to several infectious and non-infectious diseases 8. Haemolytic disease of the newborn, leukaemia, cancer, acquired B resulting from bacterial infection, and leucocyte adhesion deficiency type II are some of the diseases connected with ABO blood type9.Although, the connection between the ABO blood type and antioxidant and other biochemical marker is still controversial. Hence, the ABO blood groups effect of on antioxidant and biochemical markers is essential to be assessed scientifically and strictly. In this research, blood type O possess the highest frequency of 42 %, among which the female were 22 % and the male were 20 %. The AB group has the lowest frequency of 12.9 %, consisting of 7 % female and 5.7 % male (Include table1.0). Predominance of O and A blood type followed by B types were observed in this study 10. It was also observed in the course of this research that the blood type O is the commonest and blood group AB the rarest of the ABO blood group types 2, 10.

This present research was carried out in order to achievemajor objectives:which includes to assess the effect of ABO blood types on plasma antioxidant markers of healthy individuals and also to assess the influence of ABO blood types on human anthropometry. There were no connection between and within the ABO blood types as regards the anthropometric data which are the height, weight and the body mass index (BMI). These are inconsistent with some of the previous studies that showed subjects with blood type O to be heavier (64.78kg) followed by females with blood type AB (62.21kg), blood group A (60.88 kg) and then blood group B (60.21kg) and that those that possess the blood type B or AB appear to be somewhat shorter than types A 11. Participants with the B allele were either shorter or of equal height to types A12. Similar to our findings, earlier reports indicates that there was no connection observed between BMI and ABO blood type13.

Insufficiency in antioxidant or linked enzymes are the factors that may lead to oxidative stress. Oxidative modification of antioxidant enzymes might worsen health deviation conditions. The activity of GST and GSH increased in blood group A; but a decreased level in thiobabituric reactive substances was seen for blood group A. On the contrary, the level of thiobabituric reactive substances increased in those with blood group B. This finding is consistent with earlier report that the blood type B is one of the blood types that are more susceptible to oxidative stress 14. This was due to the availability of major carbohydrate molecules found on the red cell antigens of blood type A and B, and this can alter the metabolism of lipids in blood 14. Increased blood pressure and fast blood flow can raised the lipid oxidation and peroxidation reactions resulting to an elevation in oxidative stress in them. The liver may easily be opened to inner stimuli which eventually yields reactive oxygen species (ROS). The oxidative stress potentially may impairment the liver cells 15.

 The activity of SOD among the blood group was remarkably higher for the blood group O than in blood type A and B. The high response of SOD in O blood group contrary to that of A and B. It showed that the increased activity of SOD of all the antioxidant enzymes was peculiar to blood group O since the same pattern of activity was noticed in all the other groups. Thus blood group O can endure oxidative insult better than type A and B having been additionally equipped with better superoxide dismutase. In this research work, the blood group A and O were observed to be most different with respect to the antioxidant indicators used for this study10.found a strong connection between 'A' and 'O' blood group with respect to their ability to respond to stress. The work of GSTs in metabolism is still been explored; even though their multifaceted regulation by environmental stimuli infers that they possess an imperative protective functions 15, 16. SOD decreased in blood group AB 16.showed MDA level to be different between the blood groups, where the levels in O blood type were lower than blood groups A and B. It is shown in this study that the level of antioxidant defense were similarly better in blood type B and O than the blood type AB that experienced remarkable decrease in GST activity.

**CONCLUSION**

This present study shows the evidence of links between the ABO blood types and also the antioxidant and that there is no relationship or effect of blood group on human anthropometry.More experimental researches are also required to elucidate the possible molecular contrivances connecting the ABO blood type, to the various maladies that has been established in this study. ABO blood grouping may henceforth become part of the complex mechanism for cancer danger evaluation.

**RECOMMENDATIONS**

* Further research should be carried out to help establish these realized intriguing relationship that actually exist between the ABO blood group and the various antioxidant markers assayed for.
* The following up of the individuals used as subjects for this research as regards the findings is important.
* Notwithstanding these research indicates the need for more specific definition of antioxidant of healthy individuals among adults that are young and this will lead ultimately to more accurate diagnosis.
* This research work gives a new piece of knowledge which can take part in future researches.

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