Abo Blood Group And Total Serum Cholesterol Among Healthy Individuals In A Nigerian Population

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Citation

Abstract
Background: High serum cholesterol is strongly implicated in the development of cardiovascular diseases. The relationships between ABO blood groups and cholesterol levels have been established but differ in many studies. Method: Two hundred and ten (210) students were recruited for this study (age ranging between 18-35 year). Blood groups and total serum cholesterol were determined. Result: A chi square test among the ABO blood groups and cholesterol levels is statistically significant at \( p < 0.05 \). Conclusion: This study shows that blood group A individuals have significant elevated serum cholesterol level compared to the remaining blood groups.

INTRODUCTION
Cholesterol is a steroid alcohol with a twenty seven carbon atom that is arranged in a tetra cyclic sterane skeleton found in the cell membranes and transported in the blood plasma of all animals. It is an essential component of mammalian cell membrane where it is required to establish proper membrane permeability and fluidity; it is use for the synthesis of bile acids which are essential for fat absorption, synthesis of many hormones among which are testosterone, estrogen, progesterone, cortisol etc. it also serve as protective antioxidant. However, the main stream medical establishment has maintained that elevated serum cholesterol levels are a primary investigator of atherosclerosis and cardiovascular disease. Millions of people worldwide have been convinced by extensive promotional campaigns that the key to avoiding cardiovascular disease is to reduce cholesterol level by using lipid lowering drugs and diets low in saturated fats. Cholesterol contrary to its popular image as a potent enemy of health and longevity is actually a crucial substance that performs innumerable vital functions in the body. Several reports have appeared in recent years suggesting an association between blood groups and various manifestations of heart diseases. During the last few decades, few reports have suggested that ABO blood groups are associated with the risk of ischemic heart diseases and of developing severe manifestation of atherosclerosis. While the war on cholesterol has proved to be extremely lucrative for food and drug industries, it has delivered no benefit to public health. Cardiovascular disease is still the leading cause of death in western countries. While the number of death from cardiovascular disease has indeed decreased since the late 1960’s, total incidence of cardiovascular disease has not declined.

Also scientists are interested in the study of the possible relationship between blood groups and ischemic heart disease, and the relationship of blood groups to serum cholesterol. A number of studies revealed that healthy men and women of blood group A have higher mean serum cholesterol levels than those of group O or B. These studies implicated blood group A as risk factor for cardiac disease. The objective of this research is to find out whether there is a relationship between ABO blood group and total serum cholesterol among apparently healthy individuals.

MATERIALS AND METHOD
Two hundred and forty (240) students participated in the study. Two hundred and ten (210) comprising one hundred and fifty males and sixty females qualified for this work. Informed consent was sought individually before being enlisted for the study. A well structured questionnaire was given to each participant. Subjects used were undergraduate students of the University of Maiduguri aged between 18 and 35 years. Demographic information of the subjects was age, height, sex, weight, blood pressure. The body mass index of each student was calculated using the formula \((\text{w/h}^2)\). Students with known cases of smoking obesity,
diabetes, hypertension and other related disorders or those on medication were excluded from the study.

Serum total cholesterol was determined by enzymatic colorimetric method as described by Trinder\textsuperscript{16}. The reagent kit was manufactured by Randox laboratories, Antrim, United Kingdom. Blood groups were determined by monoclonal ABO blood grouping reagents using tile method. The reagent kits were manufactured by CLAS technology, United Kingdom. Chi-square analysis was used for statistical analysis. The results obtained were expressed in mean ± standard deviation (±SD) and in percentages. Analysis of variance was used to determine the difference among cholesterol levels within blood groups. P-value was set at (P < 0.05).

RESULTS

A total of two hundred and ten students were recruited for this study. One hundred and fifty were males and sixty were females. Forty two (20%) of the subjects were of blood group B+, fifty three (25.2%) were of blood group A+, thirteen (6.2%) were of blood group AB+ and one hundred and two (48.6%) were of blood group O+, (Table 1). The mean age of the students was 24.38 ± 4.50 yrs and the mean body mass index of the students was 22.03 ± 2.75 Kg/m². Table 2 shows the number of students with total serum cholesterol above 5.2mMol/L and those below 5.2mMol/L. A chi square test for these variation revealed that ABO blood group has a significant effect on the total serum cholesterol at 5% level of significance, with p=0.009. There is also level of significance between serum cholesterol blood groups, \( P=0.01 \) (table 3). Table 4 shows significant difference between blood group A and the combined groups (AB, B&O), with \( P=0.004 \).

DISCUSSION

Hypercholesterolemia is considered a risk factor in the development of ischemic heart diseases in addition to other factors as smoking, hypertension and diabetes\textsuperscript{17}. The study by Hafeezullah et al\textsuperscript{18} among the Pakistani population revealed that there is increased risk of coronary heart disease among blood group A individuals. It has been demonstrated in many European populations that blood phenotype A is associated with an elevated level of total cholesterol. Studies in non white population are scarce and findings generally failed to demonstrate such relationship\textsuperscript{12}. This present study among apparently healthy individuals revealed that there is increased in cholesterol levels among blood group A which is statistically significant. Our finding agrees with study by Hafeezullah et al\textsuperscript{18} that linked hypercholesterolemia to the same blood group. Rosenberg et al\textsuperscript{10} found this relationship among women under the age of 50yrs. Platt\textsuperscript{19} also found out
this relationship in both males and females and Wong et al found the same relationship in black and white adolescents.

However, this study contradicts Whincup et al study on British men who linked hypercholesterolemia in both group A and group O. Shamim et al work revealed a high level of cholesterol in both blood groups A & O, and that there was no evidence of predisposition of phenotype A as a co-marker to cardiovascular diseases. Other studies indicated that AB blood groups predominate in coronary artery patients and group O is a protective anti-atherogenic factor. Moreover, inconsistent results from cross-sectional studies of various racial groups with varying ages raised an age effect as a possible explanatory factor.

In conclusion, blood group A among few apparently healthy individuals in this study show a high level of cholesterol. However, this work agrees with the findings by Murray et al and Platt who involve age and sex as possibility in the variations of results. Nevertheless, periodic screening for cholesterol should be carried out among individuals within the academic community as they are at higher risk of developing cardiovascular diseases due to their constant changes in their lifestyle such as depending on fast food, which mostly consists of high fat diet.

References
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