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COMPARATIVE STUDY OF TOTAL HEMOGLOBIN CONTENT IN ABO BLOOD GROUPS IN HEALTHY ADULTS

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ABSTRACT

The total hemoglobin content in different ABO blood groups in healthy adults has been conflicting. This study was undertaken to find out the possible differences in the total hemoglobin content in health adults in ABO blood groups. Eighty health students were included in this study. The hemoglobin content was measured by Sahli's method and ABO blood group typing along with Rh D typing was carried out in all the students. The mean age of the students was 19.91 years with 60% being males. There was no difference in the hemoglobin contents in males and females students. Blood groups A, B, AB and O was reported in 15 (18.75%), 22 (27.5%), 5 (6.25%) and 38 (47.5%) healthy students respectively. There was no significance difference was observed in the mean hemoglobin content in four ABO blood groups.

INTRODUCTION

ABO blood groups are an inherited blood characters. The ABO blood groups are characterized by the presence of various blood group antigens on the membrane of the human red blood cells and are determined in part by the oligosaccharide head groups of the glycosphingolipids. The most important antigens are A and B antigens which differs only in their terminal sugar moieties. In A antigen, N-acetylgalactosamine represents as the terminal sugar unit whereas in B antigen galactose is the terminal suger unit. The antibodies against these red cell antigens are called agglutinins and individually they are divided into four major blood groups, that is, A, B, AB and O blood groups according to the presence of these antigens and agglutinins (Pramanik et al., 2000; Conteras et al., 2001)

Other than these blood antigens, human red cells that contain antigen D are known as Rhesus antigen D positive while those without antigen D are treated as Rhesus antigen D negative (Schneider et al., 1976; Knowle et al., 2002; Jeremiah, 2006). The total hemoglobin content in respective blood groups has not been studied well. Due to paucity of literatures, the present study was undertaken to find out the possible differences in the total hemoglobin content in health subjects in ABO blood groups.

METHODS

The study was undertaken in Department of Physiology, Maharaja Krishna Chandra Gajapati Medical College, Berhampur, Odisha, India. The study participants were undergraduate medical students of 18-22 years old. The hemoglobin content of the study participants were measured by Sahli's method (Wintrobe, 1975).

ABO blood grouping was done in all the study participants. Briefly, three cleaned test tube was taken and labeled as A, 2 and 3. In each test tube, a drop of anti-A, anti-B, and anti-AB was taken. To each test tube a drop of 5% red blood cell suspension in saline was added. The respective mixtures were gently mixed together and were centrifuged at 1000g for 30 seconds. The cell buttons were re-suspended and observed for agglutination reaction. Agglutination of tested red cells represented the positive results. A smooth cell suspension after re-suspension followed by a microscopic confirmation constituted negative test results (Jeremiah, 2006).

Similarly, Rhesus D typing (Rh D) was carried out in all the study participants. Briefly, a drop of anti-D serum was taken in a clean labeled test tube and a drop of control placed in a second cleaned test tube. One drop of 5% red cells suspension in saline was added and incubated at 37°C. After the incubation period, the contents of the tube were mixed thoroughly and centrifuged at 1000g for 30 seconds. Agglutination was read macroscopically and microscopically in doubtful cases. All negative results were confirmed using the indirect antiglobulin test (IAT) procedure (also for confirmation of weak D) (Jeremiah, 2006).

The generated data was entered in a predesigned excel Microsoft window sheet and analyzed. The categorical data were compared by using chi-square test. The comparison of mean among the two numerical data were analysed by using independent student t test and more than two numerical data was analysed by one way analysis of variance (ANOVA). A p value of <0.05 was considered for statistical significant. Graph Pad Instat version 3 for window was used for all statistical data analysis.

RESULTS

During the study period, 80 healthy students have participated in this study. The mean age of the students was 19.91±1.34 years (ranges 18 to 22 years). There were 48 (60.0%) male students compared to 32 (40.0%) female student participants. The mean age of the males students was 20.0±1.34 years compared to females students of 19.8±1.36 years. There was no statistical significant difference was observed in the age of male and female students when compared by independent student t test (t, 0.711; *p*, 0.478).

ABO blood group typing in 80 health students revealed 15 (18.75%) healthy students with blood group A, 22 (27.5%) healthy students with blood group B, 5 (6.25%) healthy students with blood group AB and 38 (47.5%) healthy students with blood group O. Further, out of the 80 healthy students, Rh D was found to be positive in 77 (96.25%) healthy students whereas rest 3 (3.75%) healthy students were found to have a Rh D negative. A single case of Rh D negative was observed in each blood group of A, B and O respectively. Out of the 3 RhD negative, 2 were femels and one was male student. The distribution of study cases (healthy students) on the basis of their ABO blood group typing and Rh blood groups has been depicted in table-1. The distribution of male and female student in different blood groups was shown in figure-1. There was no statistical significant was observed in the distributions of male and female students in four ABO blood groups ($p > 0.05$).

The total hemoglobin content in all the students have

measured by Sahli's method. The mean hemoglobin content in different blood group was 15.9±1.95, 14.9±1.91, 15.23±2.23 and 15.7±1.07 in A, B, O and AB blood groups respectively. The mean hemoglobin content in different blood groups were comparable when analyzed for statistical significance (p >0.05). The mean hemoglobin content in different blood groups was illustrated in table-2

DISCUSSION

Eighty healthy students were included in this study. The mean age of the students was 19.91 years with 60.0% being males. There was no difference in the age of males and females students. ABO blood group typing revealed majorities students with blood group O with 38 (47.5%) students followed by B blood groups with 22 (27.5%) healthy students, A blood groups with (18.75%) healthy students and rest 5 (6.25%) healthy students with blood group AB. There was no significance difference in the gender distribution among the four ABO blood groups. We have found 77 (96.25%) healthy students with Rh D positive. This data is in accordance with 96.7% reported by Ukaejiofor (Ukaejiofor et al., 1996), 95% found in Port Harcourt (Jeremiah et al., 2003) and 96.77% reported by Jeremiah in Nigeria (Jeremiah et al., 2006). To the best of my knowledge this is the first study in southern Odisha, India to elucidated the ABO blood groups with RhD typing in healthy adult students. The mean hemoglobin contents in four ABO blood groups were comparable. There was no difference in the total hemoglobin content in 4 blood groups.

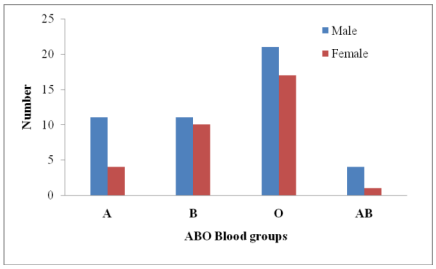
Table 1: Frequencies of ABO and Rh D type among students (n=80).

ABO Blood group	Number tested	Percentage
A	15	18.75
B	22	27.5
AB	5	6.25
O	38	47.5
Rh Blood group		
D+	77	96.25
D-	3	3.75

Table-2. The mean hemoglobin content in different blood groups of study participants (n=80).

ABO Blood groups	Hemoglobin content (g/dL) Mean ±SD
A	15.9±1.95
B	14.9±1.91
O	15.23±2.23
AB	15.7±1.07

Figure-1: Distributions of male and female students in four ABO blood groups (n=80).



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