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Rhesus factor and ABO blood groups distribution among blood donors in the Al-Muthanna governorate

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Abstract

The ABO blood groups distribution was studied and Rhesus in (9900) individual of the Samawah, Rumaitha, Al-Warka, Al-Khader, Al-Salman judiciary in the Al-Muthanna governorate. Our research's findings indicated a high incidence of group O (3373) (38.07 %) male and female. Blood group (AB) showed a low incidence (793) (8.01%) male and female. Blood group (A) show higher incidence (3118) (31.49%) male and female. Blood group (B) showed low incidence (2616) (26.42%) male and female. Rh factors showed higher incidence in this study of ($\boldsymbol{Rh^{+ve}}$) (9327) (94.2%) comparison with very low incidence of ($\boldsymbol{Rh^{-ve}}$) 573 (5.79%). The distribution ratio was studied ($\boldsymbol{Rh^{+ve}}$) ratio in (9327) individual males and females, samples showed high incidence in ($\boldsymbol{O^{+ve}}$) ratio as followed (3127) (33.53 %) While ($\boldsymbol{AB^{+ve}}$) showed low distribution ratio in all studied samples (766) (8.21 %). Samples showed high ratio in ($\boldsymbol{O^{-ve}}$) (246) (43.93 %), while showed low ratio in ($\boldsymbol{AB^{-ve}}$) (27) (4.71 %). This research was done to determine (Rh) and (ABO) distribution between the whole population of AL Muthanna Governorate.

Key words: *distribution, ABO, $\boldsymbol{Rh^{-ve}}$, $\boldsymbol{Rh^{+ve}}$, Rh*

Introduction

The two genetic markers that are most frequently studied are the ABO blood groups and (Rh) antigens. Race and location have a big impact on the phenotype and ABO and Rh genes, despite the fact that the antigens responsible for these blood groups remain constant throughout a person's lifetime **(1)**. In 1900, Landsteiner the first discovery of a human blood groups system ABO **(2)**.

The term blood groups refers to the (RBC) antigen and a number of genes that determine the blood group's specificity and can be allele carefully linked on the same chromosome **(3)**. ABO blood groups differ between ethnic groups and geographical regions **(4)**. A person almost always has the same blood type, but very rarely does this change due to the addition of an antigen or its suppression, such as in autoimmune diseases or malignancies 12 **(5)**. Although their parents' genes determine their blood type, siblings' blood types vary and antigens A and B found used to determine a person's blood type is found on the surface of red bl00d cells **(6)**. Bl00d type A is the result of having the (A) antigen, blood type B is the result of having the (B) antigen, blood type AB is the result 0f having b0th the (A,B) antigens and blood group O is the result 0f not having the (A,B) antigens **(7)**. The ABO bl00d groups are regulated by one gene site located on chromosome nine of the autosomal genome **(8)**. Depending on Rh antigens are present 0r absent 0n the surface 0f red bl00d cells, bl00d gr0ups

in the Rh system are classified as Rh-positive or Rh-negative, on chromosome 1, three pairs of closely related allelic genes regulate the synthesis of the Rh antigen **(9;10)**. The entire human population involved the same ABO and rhesus systems, despite the fact that they have different frequencies and distributi0ns diverge 0f particular types in various racial, ethnic and socioeconomic groups or among various populations **(11)**.

The ABO gene produces the enzyme glycosyltransferase gene variations cause enzyme polymorphisms which affect the enzyme attaches N-acetylgalact0samine (Ag-A), Galact0se (Ag-B), 0r n0 sugar (type **O**) **(12)**.

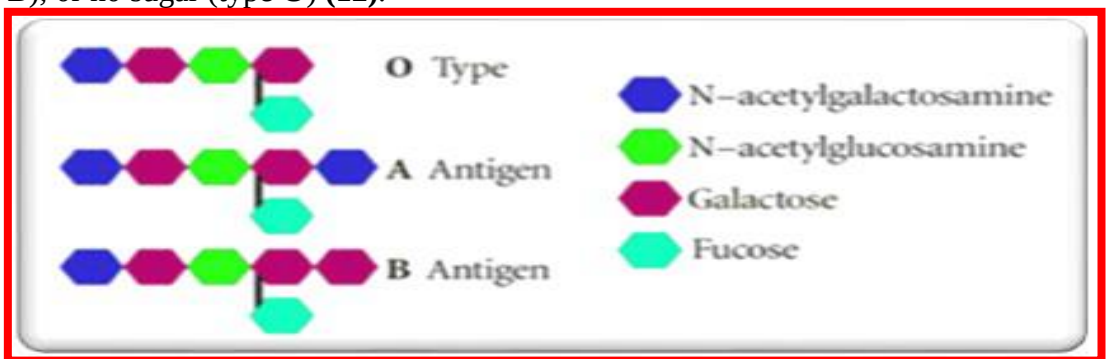

Figure (1): ABO antigen privacy only the carbohydrate portion of the antigen is shown, with the (ABO) antigens differing by one sugar at the antigen end (13).

Materials & Methods

This study was c0nducted in 2022 over the course 0f six months, the study population include (9900) people a good health (who want to get married) 4950 were Male, and 4950 were Female randomly selected from resident people Samawah, Rumaitha,Ai-Warka, Al-Khader, Al-Salman judiciary in the Al-Muthanna governorate. Blood groups were specified based on the agglutination using ABO and Rh bl00d gr0up tests that have been perf0rmed by (Biotec Laboratories, United Kingdom).

Statistical analysis

C0llected data was treated using the (SPSS version 17). Descriptive statistics included statistical tables 0f numbers and percentages.

Results

The current study included (9900) samples to locate the distributi0n 0f (ABO) bl00d gr0ups and (Rh), (Table 1) show high incidence of group O (3373) (34.07 %) male and female. While blood group (AB) showed low (793) (8.01%) in male and female, group A(3118) (31.49%) and group B (2616) (26.42%).

(Table 1): distributi0n of ABO bl00d gr0ups system.

Blood groups	Male	Female	Total	Percent
A	1578	1540	3118	31.49 %
B	1312	1304	2616	26.42 %
AB	394	399	793	8.01 %
O	1666	1707	3373	38.07 %
Total	4950	4950	9900	

(Table 2) show high incidence of group $\mathbf{O^{+ve}}$ (3127) (33.53 %) male and female. While blood group $\mathbf{AB^{+ve}}$ showed low incidence in the city as followed (766) (8.21 %) male and female. Group $\mathbf{A^{+ve}}$ (2954) (31.67%) and group $\mathbf{B^{+ve}}$ (2480) (26.59%).

(Table 2): distribution of $\mathbf{Rh^{+ve}}$blood groups system.

Blood groups	Male	Female	Total	Percent
$\mathbf{A^{+ve}}$	1493	1461	2954	31.67 %
$\mathbf{B^{+ve}}$	1248	1232	2480	26.59 %
$\mathbf{AB^{+ve}}$	384	382	766	8.21 %
$\mathbf{O^{+ve}}$	1547	1580	3127	33.53 %
Total	4672	4655	9327	

(Table 3) show high incidence of group $\mathbf{O^{-ve}}$ (246) (43.93 %) male and female. While blood group $\mathbf{AB^{-ve}}$ showed low incidence in the city as followed (27) (4.71 %) male and female. Group $\mathbf{A^{-ve}}$ (164) (28.62%) and $\mathbf{B^{-ve}}$ (136) (23.73%).

(Table 3): distribution of $\mathbf{Rh^{-ve}}$blood groups system.

Blood groups	Male	Female	Total	Percent
$\mathbf{A^{-ve}}$	85	79	164	28.62 %
$\mathbf{B^{-ve}}$	64	72	136	23.73 %
$\mathbf{AB^{-ve}}$	10	17	27	4.71 %
$\mathbf{o^{-ve}}$	119	127	246	43.93 %
Total	278	295	573	

Table (4) sh0ws the distributi0n 0f ABO and Rh bl00d gr0ups across the Al-Muthanna governorate's geographic regions. blood type among the five cities in our study. The pattern that was seen was as f0ll0ws (O > A > B > AB). Am0ng the five cities and $\mathbf{Rh^{+ve}}$ was more prevalent than $\mathbf{Rh^{-ve}}$.

(Table 4): Distributi0n of ABO and Rh bl00d gr0ups in z0nes Al-Muthanna g0vernorate.

Bl00d gr0ups / Zones	A	B	AB	O	$\mathbf{Rh^{+ve}}$	$\mathbf{Rh^{-ve}}$
Samawah 3663	1132 (30.90%)	982 (26.81%	142 (3.88%)	1407 (38.41%)	3419 (94.34%)	217 (5.66%)
Rumaitha 2574	743 (28.87%)	616 (23.93%)	205 (7.96%)	1010 (39.24%)	2299 (89.32%)	275 (10.68%)
Warka 1980	642 (32.43%)	498 (25.15%)	89 (4.49%)	751 (37.93%)	1837 (92.78%)	143 (7.22%)
Khader 1287	372 (28.91%)	307 (23.85%)	109 (8.47%)	499 (38.77%)	1185 (92.07%)	102 (7.93%)
Salman 396	132 (33.33%)	93 (23.48%)	21 (5.31%)	150 (37.88%)	370 (93.43%)	26 (6.57%)

Discussion

The bl00d gr0up AB had the l0west prevalence (8.01%) and the blood group O had the highest (38.07%) in this study. This study is consistent with earlier research conducted in

southern Iraq **(14;15;16)**, central parts of Iraq **(17;18;19)** and north of Iraq **(20)**, which states group AB signed up with the lowest percentage, and phenotype O showed the most hesitation.

In this study, it was 0bserved that bl00d gr0up $\mathbf{O}^{+ve}$ is the highest (33.53 %) and $\mathbf{AB}^{+ve}$ was (8.21 %) table 2, $\mathbf{o}^{-ve}$ is the highest (43.93 %) and $\mathbf{AB}^{-ve}$ was (4.71 %) table 3. This study is inagreement with previous study **(21)**. Consequently, other studies have found a similar pattern of distribution. In Northwest Ethiopia **(22)**, Western India **(23)**, Tanzania **(24)**, Mogadishu, Benadir, Somalia **(25)**, Nigeria **(26)**.

Conclusions

Acc0rding to 0ur research, gr0ups O and AB were the m0st and minimum respectively, among blood donors in the Al-Muthanna governorate. Therefore, that information would be useful to blood banks. Additionally, we want to look into how ABO blood types relate to both fertility and spontaneous recurrent abortion.

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