Distribution of ABO and Rhesus Blood Group in Healthy Population of District Hyderabad, Sindh

Shakil Ahmed Shaikh, Zulfiqar Ali Laghari, Salma Farukh Memon, Jamshed Warsi

ABSTRACT

OBJECTIVE: To establish the trends of ABO and Rh (Rhesus) Blood group in district Hyderabad, Sindh.
METHODOLOGY: This cross-sectional study carried out at department of Physiology University of Sindh Jamshoro from August-December 2019. Simple random technique used for collection of data. In this study, 4000 participants included to establish the trends of ABO and Rh blood group by standard method. Consent taken from all participants, after they have been informed about this study. Data analyzed on SPSS 16.0 version software.
RESULTS: The most common blood group found was B (35%), followed by O (33.25%), A (22.25%) and less common blood group is AB (9.5%). The majority of population is Rh-positive 92%, where as 8% is Rh-negative.
CONCLUSION: Incidence of B blood group is higher than O,A, and AB and incidence of Rhesus positive is common against Rhesus negative.

KEYWORDS: ABO Blood Group, Rhesus Blood Group, Incidence.

INTRODUCTION

More than a hundred years ago, Karl Landsteiner Austrian physiologist discovered the system of ABO blood group antigens and received Nobel Prize in Physiology / Medicine in 1930. Since the breakthrough of ABO blood group system, the single blood test to determine blood group is ABO blood group system in laboratories to avoid death and diseases. The most common reason of death due to blood transfusion is incompatibility of ABO blood group[1]. In the year 1937, Alexander S Wiener discovered Rh blood group system that is second most significant blood group system because of haemolytic disease of infant and its significance in Rh-Negative population in successive transfusion of blood once they form Rh-antibodies[2].

Classification of blood group depends on the presence/absences of antigens (A, B, and H antigens) and these are complex carbohydrate molecules, which are not only attached to the membrane of red blood cells but also different human cells and tissues including platelets, neurons, epithelia, urine and tears that are used in forensic investigations. Hence, it is reasonable hypothesized that these carbohydrate molecules are not only important in transfusion medicine and transplantation but also for pathogenesis of different diseases [3].Blood groups are determined by heredity and exhibit polymorphism in different populations. Till to date 39 blood group systems have been discovered by the international

society of blood transfusion (ISBT). These blood groups, genetically transferred from both parents and controlled through single gene attached on long arm of ninth chromosome with three different alleles, including i, IA and IB alleles are dominant over i, expressing a special dominance association (codominance), that means type A and type B parents can have an AB-type child and O-type child if they are both heterozygous (IBi, IAi) [4].

Trends of ABO blood group differ from geographical areas, in races and within subgroups. Even in Pakistan variations of blood groups in different areas indicating difference in races , evolution, and their association to environment and disease[5]. Therefore, it was considered worthwhile to establish the trend of ABO blood group in the population residing in the District Hyderabad, Sindh.

METHODOLOGY

This cross-sectional study was carried out in physiology department, university of sindh Jamshoro, from August-December 2019. Simple random technique was used for collection of data. The data collected through interview and self-structured questionnaire that include age, sex weight, height, physical activity, socio demographic characters, educational standards, food history, smoking history, ABO blood group if known, and history of illness. In this study, total number of 4000 young healthy participants were recruited. Out of 4000 participants,

2060 were male and 1940 were females. In this study, Verbal and written consent were taken from all participants.

ABO blood group determined through antigen-antibody agglutination test. The collected data were analyzed on SPSS version 16.0.

RESULTS

The results of our study describe the frequency of ABO and Rh Blood group in participants, in blood group A overall participant 900 (22.25%), males were 480 (23.3%), and females were 400 (20.61%). In B blood group, overall participants were 1400 (35%), males were 750 (36.40%), and females were 660 (34.02%). In AB blood group, overall participants were 380 (9.5%), males were 180 (8.73%), and females were 200 (10.30%). In O Blood Group, overall participants were 1330 that are 33.25%, males were 650 (31.55%), and females were 680 (35.05%). In Rh-Positive Blood group system, overall participants were 3680 (92%), males were 1920 (93.20%), and females were 1760 (90.72%). In Rh-Negative blood group system, overall participants were 320 (8%), males were 140(6.79%), and females were 180 (9.27%) Table I.

TABLE I: DISTRIBUTION OF PARTICIPANTS ACCORDING TO ABO AND RH BLOOD GROUP SYSTEM

Blood Group	Overall (n=4000)	Male (n=2060)	Female(n=1940)
A	900 (22.25%)	480 (23.3%)	400 (20.61%)
B	1400 (35%)	750 (36.40%)	660 (34.02%)
AB	380 (9.5%)	180 (8.73%)	200 (10.30%)
O	1330 (33.25%)	650 (31.55%)	680 (35.05%)
Total	4000	2060	1940
Rh-Positive	3680 (92%)	1920 (93.20%)	1760 (90.72%)
Rh-Negative	320(8%)	140 (6.79%)	180 (9.27%)
Total	**4000**	**2060**	**1940**

* Rh= Rhesus

DISCUSSION

The ABO and Rh blood group systems are the most commonly utilized grouping systems in blood transfusion. The association of different blood groups with diseases is important, as some of the blood groups are particularly prone to develop certain diseases. These systems are also well defined as a genetic markers and anthropometric studies. Blood group remains always important for researchers because of its correlation with different diseases e.g: hypertension, stroke, ulcer, diabetes, and various cancers etc. The trend of blood group varies ethnically, regionally and in various populations[6]. Therefore, it is important to document prevalence of ABO and Rh blood groups in district Hyderabad. In this study, we reported that B blood group is most prevalent with 35%, O=33.25%, A=28% and AB=9.5%. The trend we found indicates that blood group B is most prevalent followed by O, A, and AB, while Rh- Positive and Rh- Negative in district Hyderabad population. The result of this study is in agreement with Indian Sub-continent and the other studies conducted in different areas of Pakistan[7]. Table II

However, other studies conducted in interior Sindh and Karachi[8] are in contrast to our results. This difference in frequency of blood groups are due to number of factors including; compatibility within mother and child, external environment, variation in geography, racial and genetic differences, and migration. However, these studies are in agreement with Rh blood system trends Rh-Positive > Rh-Negative[6,8,9].

Result of our study is in agreement with the trends of India. However, O blood group is most prevalent and AB blood group is less prevalent in world. All studies are in agreement with Rh trend of our result. However, this difference of trends in ABO blood group system is

TABLE II: COMPARISON OF CURRENT STUDY OF ABO AND RH BLOOD GROUP WITH OTHER REGIONS OF PAKISTAN

Cities	A	B	AB	O	Rh-Positive	Rh-Negative	Reference
This Study	22.25%	35%	9.5%	33.25%	92%	8%	
Rawalpindi/ Islamabad	23%	34%	11%	32%	92.8%	7.2%	6
Peshawar	28%	34%	7%	31%	92.5%	7.5%	6
Mardan	24.8%	28%	19.4%	27.9%	94.3%	5.7%	6
Multan	21.9%	36.9%	7.3%	33.8%	92.2%	7.8%	9
Karachi	14.4%	38.1%	8.3%	39.2%	94.5%	5.5%	8
Interior Sindh	24.90%	31.80%	6.90%	35.50%	91.30%	8.70%	9

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TABLE III: COMPARISON OF CURRENT STUDY OF ABO AND RH BLOOD GROUP WITH OTHER PARTS OF THE WORLD

Country	A	B	AB	O	Rh-Positive	Rh-Negative	Reference
Saudi Arabia	33.4%	6%	3.8%	56.8%	92.8%	7.2%	10
USA	41%	9%	4%	46%	85%	15%	11
Australia	38%	10%	3%	49%			11
Nepal	34%	29%	4%	33%	96.3%	3.3%	11
Iran	33.1%	23.3%	8.9%	34.7%	88.7%	11.3%	12
Bangladesh	26.7%	34.4%	8.6%	30.4%	97.4%	2.6%	13
India (Gujarat)	21.9%	37.6%	9.3%	31.2%	97.3%	2.7%	11
Current Study	22.25%	35%	9.5%	33.25%	92%	8%	

due to geographical, racial, external environment, and hereditary traits[10-12] Table III.

CONCLUSION

In this study, we concluded that Blood group phenotype B is more prevalent blood group while blood group AB found less prevalent, while Rh-positive is more prevalent than Rh-negative trends in district Hyderabad Sindh Pakistan. Having information about own blood group is helpful for everyone. It saves life when blood transfusion is required. This study will be helpful for blood bank for management and blood donation in crisis.

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AUTHOR CONTRIBUTIONS

Ahmed S: Concept, main author
Laghari Z: Supervised all aspects of study
Memon S: Data analysis
Warsi J: Data Collection

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