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Frequency of ABO and Rhesus Blood Groups: A Study among the donors of Sir.T.Hospital Bhavnagar, Gujarat

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ABSTRACT

Background & Objectives: *The ABO blood group system was the first human blood group system to be discovered by Landsteiner in 1900. The second type of blood group is the rhesus system. There are only two Rh phenotype such as Rh positive and Rh negative, depending on whether Rh antigen is present on the red cell or not. The frequency of ABO and Rh phenotypes in different populations has been extensively studied. The present study was done to assess the prevalence of blood groups in different categories of bhavnagar and to compare our results with other studies conducted in India and elsewhere in the world and its multipurpose future utilities for the health planner.*

Materials and Method: *A retrospective study was carried out on 40416 blood donors (male and female) during a period of three year from 1st January2012 to 31st December 2014, donors were selected and screened for study in the sir. T. Hospital Blood Bank, Bhavnagar Gujrat. India. . Each sample of donors was tested for ABO and Rhesus group status using antisera (Eryclone Monoclonal ABO/Rh, Tulip Diagnostic Ltd. Goa, India) combined slide and tube method*

Results: *The frequency of various blood group according to present study, from table -1: B+ve 33.4%, O+ve 29.4%, A+ve 21.86%, AB+VE 8.9%, B-ve 2.3%, O-ve 2%, A-ve 1.46% & rarest being AB-ve 0.7% Also from Table 2: Rh-Group positive are 93.57% and Rh –Neg less common with 6.42% prevalence Conclusion group "B" is most common Blood group in Bhavnagar population followed by "O"A,and AB Blood Group, also Rh-Group positive are 93.57% and Rh –Neg less common with 6.42% prevalence*

Keywords: *blood donor ,blood group ,ABO,Rhesus (Rh)*

INTRODUCTION

The ABO blood group system was the first human blood group system to be discovered by Landsteiner in 1900. The ABO blood group system is the only system in which antibodies are consistently and predictably present in the serum of normal individuals whose red cells lack the antigens[1] The second type of blood group is the rhesus system. There are only two Rh phenotype such as Rh positive and Rh negative, depending on whether Rh antigen is present on the red cell or not. Determination of ABO blood groups is done by detecting A and B antigens. In addition, known red cells are used to detect anti-A and anti-B in

the serum, by a process called 'reverse' grouping. ABO and Rh gene phenotypes vary widely across races and geographical boundaries [2,3,4] Together these two systems have proved to be the most important for blood transfusion purposes. In modern medicine, the need for blood group frequency and prevalence studies is multipurpose, as besides their importance in evolution, their relation to disease and environment is being increasingly important [5,6]. Blood groups are genetically determined. The vast majority are inherited in a simple Mendelian fashion and are stable characteristics which are useful in paternity testing.[7] group is essential for effective management of blood banks inventory, be it a facility of a smaller local transfusion service or a regional or national transfusion service. It is, therefore, imperative to have information on the distribution of these blood groups in any population.[8]

The present study was done to assess the prevalence of blood groups in different categories of Sir Takhtasinhji general hospital, bhavnagar India and to compare our results with other studies conducted in India and elsewhere in the world and its multipurpose future utilities for the health planners.

OBJECTIVES

This study is aimed to determine frequency and distribution ABO and Rh blood group patterns among blood donors in the sir T. Hospital Blood Bank, Bhavnagar, Gujarat and compare with other data from similar studies within the India and all over the world.

MATERIALS AND METHOD

A retrospective study was carried out on 40416 blood donors (male and female) during a period of one year from 1st January2012 to 31st December 2014 in the sir. T. Hospital Blood Bank, Bhavnagar Gujrat. India the blood donors were selected after taking a detailed history and a complete examination regarding their eligibility criteria for blood donation. Donor's name, age, sex, occupation, caste, complete postal address and contact number was taken. Donors were deferred or accepted according to their medical history regarding chronic or acute diseases. Findings were further confirmed by physical examination of the patient. Blood was taken from a donor only after fulfilling all the eligibility criteria of a healthy donor. Blood was taken for donors who were between 18-60 years of age, more than 45 kg weight with hemoglobin more than 12.5 g%. The donors have no history of any disease, infection or recent treatment. Written consent was also taken from them prior to donation regarding their acceptability for the tests to be carried out for the transfusion transmitted diseases. The Blood samples were obtained by standard procedures of venupuncture and subjected to determination of ABO and Rhesus blood group using antisera (Eryclone Monoclonal ABO/Rh, Tulip Diagnostic Ltd. Goa, India) by combined slide and test tube method. Each sample of donors was tested for ABO and Rhesus status

OBSERVATION AND RESULTS

Table -1: Distribution of ABO and Rh Blood group system

Group	Total Donors 2012	%	Total Donors 2013	%	Total Donors 2014	%
A+VE	2535	22.4	2932	21.4	3385	21.8
A-VE	164	1.4	205	33.3	240	1.5
B+VE	3769	33.2	4554	8.7	5177	33.7
B-VE	277	2.5	306	30.0	346	2.1
AB+VE	1002	8.8	1192	1.5	1412	9.2
AB-VE	66	0.9	97	2.3	86	0.5
O+VE	3268	29.0	4110	0.7	4533	29.1
O-VE	207	1.8	282	2.1	326	2.1
Total	**11288**	**100**	**13678**	**100**	**15505**	**100**

Table- 2: Rh blood group frequency in present study

	Rh +ve	**Rh –ve**	
2012	10574	714	
2013	12788	890	
2014	14507	998 = 40471	
Total	37869 (93.57%)	2602 (6.42%)	

Figure 1: Bar diagram showing number of blood donors in group wise distribution in Bhavnagar population in 3 years 2012, 2013 and 2014

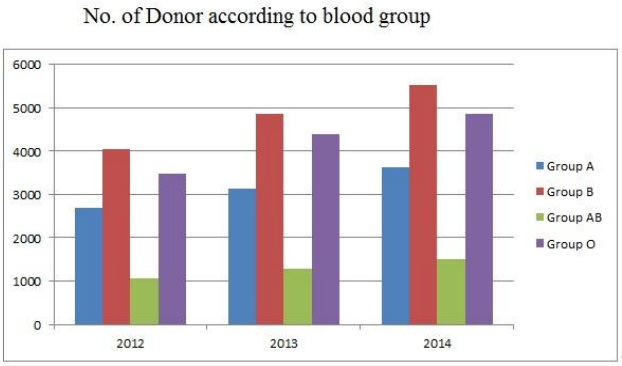
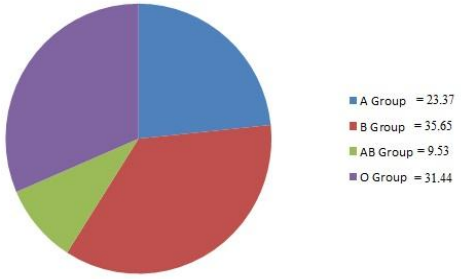


Figure 2: Pie Diagram showing frequency of different blood groups



From above result our study has determind the distribution & frequency of ABO & Rh Blood group among the – 40471 Donor, coming to Sir T. Hospital, Blood bank, Bhavnagar in Year Jan -2012 To Dec -2014. Our Result state that blood group "B" is most common followed by "O" Blood Group.

The frequency of various blood group according to present study, from table -1: B+ve 33.4%, O+ve 29.4%, A+ve 21.86%, AB+VE 8.9%, B-ve 2.3%, O-ve 2%, A-ve 1.46% & rarest being AB-ve 0.7% Also from Table 2: Rh-Group positive are 93.57% and Rh –Neg less common with 6.42% prevalence.

Table -3: Comparison study on frequency of ABO & Rhesus Blood Group in it deferent geographical areas

Region	A (%)	B (%)	O (%)	AB (%)	Rh +ve	Rh -ve
Present study	23.33	35.7	31.4	9.6	93.5	6.4
Eastern-ahemdabad[9]	23.3	35.5	32.5	8.8	94.2	5.8
Vellore [11]	18.85	32.69	38.75	5.27	94.5	5.47
Bangalore [12]	23.85	29.95	39.82	6.37	94.3	6.7
Chittor [13]	18.95	25.79	47.37	7.89	90.6	8.4
Pakistan [10]	23.8	38	10	10	89.1	10.9
Nepal [14]	34	29	33	4	96.7	3.3
Niger delta[15]	23.8	20.7	52.7	2.8	93.9	6.12
USA [16]	41	9	46	4	85	15
Britain [17]	41.7	8.6	46.7	3	83	17

The comparison of frequency and distribution of ABO and Rh Group in blood donor at present study with the similar studies carried out within and outside India is describe in table-3, Distribution of ABO and Rh grouping was amparable to the studies done at Eastern Ahmedabad 9, and Pakistan 10, All these studies have described "B" as most frequent and "AB" as least common Blood Group.

The second most common is "O" in resent study as well as in Eastern Ahmedabad [9],

Whereas in southern India [(11,12,13)] have described contras finding with "O" being the most common followed by "B", "A" and "AB"

In Nepal [14], Britain [17], USA [16], "O" and "A" are the common blood group that are followed by "B" and "AB".

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In Nigeria [15] "O" is the predominantly encountered blood group for more than 50% of Donors and AB has least common accordance.

This difference in Phenotype of Blood group is due to the prevalence of autosomal genes at various geographer regions. Due to autosomal inheritance male and female data does not affect the frequency of blood group phenotypes 18.From our observation we can state that blood group system not only help in transfusion service, but also help to take preventative measure against disease which are associated with different blood group. There is known genetic association of specific blood group to certain disease in certain population. Group "A" more frequency with coronary heart disease, IHD, Venous Thrombus, and atherosclerosis with its low in people with blood group "O" which state to have protective

effect against this disease (19,20,21)The "B" antigen increase risk of ovarian ca.22, Gastric carcinoma. More common in blood group "A" and least in group "O" 23,

In short, generation of simple database of blood group not only provide date about the availability of human blood in case of emergency regional natural comities but also serve to enable insight into possibilities to future burden of disease, it useful to health planner while making efforts to face the future health challengers' in the region

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