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DISTRIBUTION OF ABO AND RH BLOOD GROUPS IN A TERTIARY CARE HOSPITAL BLOOD BANK

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ABSTRACT

ABO and Rh groups are the most important blood groups in human beings. Study of the distribution of blood groups plays a vital role in organ transplantation, genetics research, human evolution, forensic pathology and in blood transfusion practice. Aim of the study was to study the distribution of ABO and Rh blood groups. A retrospective study was carried out at tertiary care hospital blood bank from January 2014 to December 2014. A total of 3099 samples were tested for ABO and Rh groups. O positive was seen in 810 cases (26.13%), A positive in 655 (21.13%), B positive in 534 (17.23%), AB positive in 418 (13.5 %), O negative in 287(9.2%), A negative in 201(6.48%), B negative in 131(5.2%), and AB negative in 63 (2.03%) cases. Male patients were more in the study accounting to 68%. Knowledge about the incidence of blood groups in blood banks plays significant role in blood transfusion and inventory management.

KEYWORDS: **Blood group, ABO, Rh, transfusion.**

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INTRODUCTION

Documentation of Blood grouping is a part of standard blood banking and transfusion services and its determination plays a vital role in transfusion safety. Blood group is a system of antigens present on the surface of red blood cells. Blood groups are genetically determined. All human population share the same blood group system, although they differ in the frequencies of specific types [1].The discovery of ABO blood groups by Karl Landsteiner was an important achievement in the history of blood transfusion that was followed by the discovery of Rh (D) antigen[2, 3]. A, B, AB and O blood groups are the most common and the distribution is not constant with variations among the population in a region and also across different regions throughout the world. Rhesus (Rh D) is also variable from one population to the other. Rh D system emerged as the second most important blood group system due to haemolytic disease of the new born and its importance in Rh D negative individuals in subsequent transfusions once they develop Rh antibodies [4].

MATERIALS AND METHODS

A retrospective study was carried out at a tertiary health care hospital, Blood Bank, from January 2014 to December 2014. Blood groups of donors and patients of either sex were studied. A total of 3099 samples were screened for their blood groups. Both forward (cell grouping) and reverse grouping (serum grouping) were done by test tube agglutination method. Commercially available antisera (anti A, anti B and anti D) were used for forward blood grouping . Pooled known A, B and O cells which are daily prepared in the blood bank were used for reverse grouping. Final blood group was confirmed if both forward and reverse groups were identical.

RESULTS

A total of 3099 samples were tested for ABO and Rh blood grouping. Majority of them were males (68.2%) with a male to female ratio (M:F) of 2:1.Table 2 gives the distribution of ABO and Rh blood groups. The most frequent blood group in our study was O positive (26.13%), followed by A positive (21.13%) and B positive in (17.23%). AB negative was the least common accounting for (2.03 %) cases.

Table 1
shows distribution of ABO blood groups

Blood group	Total number	Percentage (%)
O positive	810	26.13
A positive	655	21.13
B positive	534	17.23
AB positive	418	13.50
O negative	287	9.20
A negative	201	6.48
B negative	131	4.20
AB negative	63	2.03

Table 2
Comparison of incidence of ABO and Rh blood groups by authors in India with the present study

Authors	A (%)	B (%)	AB(%)	0 (%)	Rh positive	Rh negative
Chandrika Rao et al[6]	25.8	27.3	4.8	42.01	94.64	5.35
Girish CJ et al [8]	24.27	29.43	7.13	39.17	94.93	5.07
Periyavan et al[9]	23.85	29.95	6.37	39.82	94.2	5.8
Mallikarjuna S et al [10]	26.15	29.85	7.24	31.76	94.8	5.2
Present study	21.76	21.43	15.53	35.33	78	22

Table 3
Comparison of incidence of ABO and Rh blood groups by authors across the world with the present study

Authors	A (%)	B (%)	AB (%)	O (%)	Rh positive	Rh negative
Frances et al[11]	41.10	9.0	4.0	46.0	85	15
Behra R et al [12]	42.0	8.0	3.0	47.0	83	17
Mwangni J et al[13]	21.60	21.40	2.80	54.20	95.2	4.8
Bashwari LA et al[14]	24.0	17.0	4.0	52.0	93	7
Present study	21.76	21.43	15.53	35.33	78	22

DISCUSSION

Knowledge about the distribution of ABO and Rh blood antigens is very important in the management of blood transfusion services [5]. Also, the distribution of blood groups plays a vital role in organ transplantation, genetics research, human evolution and forensic pathology. Some blood groups have shown association with diseases like duodenal ulcer, diabetes mellitus and urinary tract infections [6]. Susceptibility to several diseases has been associated with ABO phenotype [7]. Persons with A group are more affected with coronary heart disease, ischemic heart disease and venous thrombosis but it is low in O group individuals which is due to a protective effect against these diseases in O Blood group. Also O group individuals are known to have 14% reduced risk of squamous cell carcinoma and 4% reduced risk of basal cell carcinoma. Gastric cancer is more common in group A and least in group O. B blood group is associated with ovarian cancer. So blood grouping not only gives us a data regarding availability of blood during emergency but also provides the idea of possibilities of certain diseases that will occur in a person later in life.[1]O blood group is the commonest in our study which is consistent with many studies in different regions in India [6, 8, 9, 10] and across the world [11, 12, 13, 14]. (Table 2 and 3) AB blood group was the less frequent compared to present study. Incidence of Rh positivity is higher than Rh negativity in the present study which is comparable with other studies where incidence of Rh (D) positivity ranges from 83%to 95.20% and Rh (D) negativity from 5.2% to 17% [10,12] . Determination of Rh phenotypes plays a major role in preventing alloimmunization and in avoiding adverse events in multitransfusion cases [15].

CONCLUSION

Knowledge about the incidence of blood groups in blood banks plays a significant role in blood transfusion in case of emergency. Variations in the incidence of ABO blood groups vary from region to region throughout the world which in turn helps us to analyse the demand for a particular blood group. Determination of Rh (D) blood group prevents erythroblastosis foetalis.

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