

**Original Research Article****Prevalence of ABO and RH Blood Groups in Tumkur, Karnataka****Krishna M.C.<sup>1</sup>, Harish S.G.<sup>2</sup>**

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**Abstract**

Blood grouping plays an important vital role in blood and its component transfusions. Blood groups are further grouped as major and minor blood groups. The ABO and Rhesus (Rh) blood groups belongs to major blood group system. These groups vary from individual to individual and also in different parts of the country. The aim of this study is to know the distribution and pattern of different blood groups prevalence in and around Tumkur. The blood groups were done in the blood bank unit. 4114 individuals are screened for ABO and Rhesus (Rh) blood groups. Among the ABO system the commonest blood group is group O, followed by group B, and group A. The least common group is AB. The same individuals are subjected for Rh grouping. The distribution of Rh-positive and Rh-negative group are 94.87% and 5.13% respectively.

**Keywords:** ABO Blood Group; Rh Group.

**Introduction**

Karl Landsteiner an Austrian scientist described the first human blood group ABO system in 1901. He was awarded with noble prize for this discovery in the year 1930. This discovery laid the door to open the birth of wide spectrum of innovations in the field of Immuno-heamatology. The discovery of ABO system is an important achievement in the history of transfusion medicine [1].

In 1941 both Karl Landsteiner and Weiner discovered Rhesus (Rh) blood group which is another important major blood group system.

The blood groups of individuals are determined by the presence of antigens on red blood cells. The genes of ABO and Rh are located on chromosome nine and one. The distribution of ABO and Rh groups vary from one individual to another and one area to another area. Red blood cells will have surface specific antigens known as agglutinogens and antibodies against these antigens are known as agglutinins. The individuals are classified

according to the presence or absence of agglutinins and antigens into four major blood groups, i.e. A, B, AB and O group [2]. The management of blood bank inventory needs to know the distribution of various blood groups in the locality, It is an essential part of any blood bank to keep the information of pattern and distribution of blood groups so that it helps in good inventory control [3]. Blood group system plays an important vital role in blood transfusion, anthropology, tracing ancestral relation of humans and evolution of human beings [4]. It is also important to know the blood group system as some of the diseases like and ABO & Rh incompatibility of newborn, duodenal ulcer, urinary tract infection and diabetes mellitus [4], The present study is to analyze the pattern of ABO and Rh blood group system in Tumkur.

**Material and Methods**

The study includes 4114 individuals who are donors, people visited blood donation camps, patients both out-

patients and in-patients as well as newborns of Shridevi Institute of Medical Sciences and Research hospital, Tumkur. The study period is between January 2017 to July 2017 inclusive of both months. The blood samples are collected mainly by finger prick method in majority of the individuals and also by venepuncture method. In case of venepuncture blood is immediately transferred to a tube containing ethylene diamine tetra acetic acid (EDTA) anticoagulant.

The procedure adopted for ABO and Rh blood grouping is slide agglutination method. The antisera which are commercially available are used for grouping. Antisera - A and Antisera - B are used for determination of ABO blood group. The anti sera - D is most immunogenic. It is used to determine Rh positive and Rh negative group by presence or absence of agglutination respectively.

## Results

During the study period, 4114 individuals are examined for ABO and Rh blood grouping. Among 4114 individuals

group O constituted 1544 (37.53%), group B-1286 (31.26%), group A- 982 (23.87%) and group AB- 302 (7.34%). In ABO blood group system most common blood group is group O and the least common group is AB group. The distribution of ABO blood group is tabulated in Table 1.

In Rh blood group system out of total 4114 individuals examined, 3903 (94.87%) individuals belongs to Rh-positive group and 211 (5.13%) are Rh-negative. The distribution of Rh blood group is tabulated in Table 2.

The commonest blood group is blood group O Positive 1456 (94.3%) and the least is AB Negative 07 (2.32%) blood groups. The distribution pattern of both ABO blood group and Rh blood grouping has been tabulated in Table 3.

Studies from eastern region, western region, central part, northern part and southern part of India have been compared. The blood group distribution varies marginally in different regions of the country. The percentage wise distribution of ABO and Rhesus (D) blood group in different parts of India are tabulated as shown in Table 4.

**Table 1:** Showing the number and percentage of ABO blood groups

Type of Blood group	Number	Percentage
A	982	23.87
B	1286	31.26
AB	302	7.34
O	1544	37.53

**Table 2:** Showing the number and percentage of ABO blood groups

Type	Number	Percentage
Rh Positive	3903	94.87
Rh Negative	211	5.13

**Table 3:** Showing the pattern of both ABO and Rh group

ABO type	Rh Positive	Rh Negative
A	929 (94.60%)	53 (5.40%)
B	1223 (95.10%)	63 (4.90%)
AB	295 (97.68%)	07 (2.32%)
O	1456 (94.30%)	88 (5.70%)

**Table 4:** Showing Percentage wise distribution of of ABO and Rhesus (D) blood group in different parts of India

Study area	ABO system				Rh grouping	
	A	B	AB	O	Positive	Negative
Tripura <sup>7</sup>	23.77	32.80	9.64	32.75	97.06	2.94
Punjab <sup>8</sup>	21.91	37.56	9.30	31.23	97.30	2.30
Rajasthan <sup>9</sup>	25.02	31.76	10.40	32.80	93.40	6.60
Guajrath <sup>10</sup>	23.30	35.50	8.80	32.50	94.20	5.80
Lucknow <sup>11</sup>	21.73	39.84	5.33	29.10	95.71	4.29
Maharastra <sup>12</sup>	23.38	31.89	8.72	30.99	95.36	4.64
Hyderabad <sup>13</sup>	19.57	34.11	5.76	40.54	95.37	4.63
Pondichery <sup>14</sup>	39.50	20.50	6.50	34.00	97.00	3.00
Bangalore <sup>15</sup>	23.85	29.95	6.37	39.82	94.20	5.80
Bellary <sup>16</sup>	22.40	35.28	8.49	34.33	94.75	5.25
Present study	23.87	31.26	7.34	37.53	94.87	5.13

**Table 5:** Showing distribution ABO and Rh blood group in different countries.

Country wise	ABO SYSTEM				Rh Typing	
	A	B	AB	O	Rh Positive	Rh Negative
USA <sup>17</sup>	41.00	9.00	4.00	46.00	85	15
Saudi Arabia <sup>18</sup>	24.00	17.00	4.00	52.00	93	7
Nepal <sup>19</sup>	34.00	29.00	4.00	33.00	97	3
Britain <sup>20</sup>	41.70	8.60	3.00	46.70	83	17
Nigeria <sup>21</sup>	21.60	21.40	2.80	54.20	95	5
Guniea <sup>22</sup>	22.50	23.70	4.70	48.90	96	4
Present study	23.87	31.26	7.34	37.53	95	5

Studies from different countries has also been compared. The percentage of distribution ABO and Rh blood group in different countries is as shown in Table 5.

### Discussion

It is a fact that the antigens involved in blood grouping system are stable throughout despite this ABO and Rh genes and phenotypes vary widely across geographical areas and the different races [3,5].

Blood grouping is important in population studies particularly relating to genetic studies such as identification of haemolytic disease of new born and evaluation of ABO and Rh incompatibility. It is also helpful in medico legal issues like disputes in paternity/maternity identification [6].

Determination and knowledge regarding the blood group is very critical during obstetric and surgical emergencies to save the lives, there by reducing maternal mortality due to haemorrhages. .By storing the safe and sufficient supply of blood is very much needed in bringing down the preventable deaths.

Preparing a regular and updated database regarding the blood groups availability in the locality is at most important to provide data of availability of blood group during acute medical and surgical emergencies. It is also helpful for future planning for blood inventory as well as to know the burden of diseases [5].

### Conclusion

The distribution pattern of ABO and Rh grouping in a particular geographic area is more helpful for planning and good inventory management in Blood banking system. Awareness about the blood group in the individual and the staff of blood bank is at most important during phlebotomy procedures and also during blood transfusion services. The prediction of blood group and distribution helps in policy formulation by health agencies.

In our study the data collected from blood bank registry, blood donation camps and laboratory data has been

tabulated. The commonest blood group in our area is O positive and the least available group is AB negative.

An attempt has been made for comparison between different regions using the Indian studies and western literature. The blood group varies from region to region. By collecting the data will help in proper planning of blood bank inventory, thereby establishing functional blood transfusion services. As there is an increase demand for safe blood and blood components, proper and adequate knowledge about frequency distribution of each ABO and Rh blood groups is needed. Hence, this study reflects the distribution of ABO & Rh groups in Tumkur area.

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### Inclusion Criteria

Only residents of in and around Tumkur geographical area.

### Exclusion Criteria

Individuals outside Tumkur geographical area.

*Conflicts of Interest:* Nil

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