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FREQUENCY AND DISTRIBUTION OF ABO & RH BLOOD GROUP IN BILASPUR DISTRICT OF CHHATTISGARH STATE: A STUDY FROM MEDICAL COLLEGE HOSPITAL

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ABSTRACT: BACKGROUND: Approximate 30 blood group systems have discovered and more than 400 erythrocytes antigens are identified. Blood group ABO and Rh are most important among all other blood group systems in transfusion service practices. The frequency of four major blood groups namely A, B, O, AB with Rh Positive and Negative varies in different population of the world and differ also in region and race wise. **MATERIAL AND METHOD:** This 5 years retrospective study was conducted at Blood Bank of a Medical college Hospital of Bilaspur in Northern Chhattisgarh, catering the 1/3 population of state. Data were collected from the Blood Bank Grouping record from the period of January 2010 to December 2014. Blood group of blood donors and patients were determined by Monoclonal Anti Sera by slide agglutinations tests. Rare case and difficult case were examined by test tube agglutination method and Matrix Gel System of Tulip. **RESULT AND CONCLUSION:** 31973 subjects were examined for blood group during observation period, Out of these 31092(97.25%) were male and 881 (2.75%) were female. The frequency of blood group B in these populations was 11007 (34.42%) (33.36% Rh Positive and 1.06% Rh Negative) Followed by O were 10864 (33.97%) (33.33% Rh Positive and 0.64% Rh Negative), A was 9113 (28.50 %) (27.99 % Rh Positive and 0.51% Rh Negative) and AB was 989 (3.11%) (3.01% Rh Positive and 0.1% Rh Negative). Rhesus group Rh Positive were 31242 (97.7 %) and Rh Negative were 731 (2.3 %).

KEYWORDS: Blood Group, ABO, Rhesus (Rh), FRU First referral Unit.

INTRODUCTION: Blood Group plays a vital role in blood transfusion safety. People have different blood group based on the antigen present over the erythrocytes. Blood group antigens are hereditary determinate and it is important to understand genetics, inheritance pattern and disease susceptibility.^{1,2} Approximate 700 erythrocytes antigens are described and organized into 30 blood group systems by International Society of Blood Transfusion of which ABO and Rh are most important in transfusion practices.³

In 1900, Karl Landsteiner discovered the blood groups ABO and classified human blood group into A, B and O groups. A fourth blood group AB was discovered by Von Decastello & Sturli in 1902.⁴ This marked the beginning of the whole subject of Blood group serology and made blood transfusion practicable. Levine and Statson described an antigen in the serum and was subsequently re-examined by Levine and Statson and was named Rh System in 1940. Blood transfusion practices have become more practicable after the discovery of Rh system.⁵

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Human populations share the same blood group systems but they differ in frequency of specific types. The frequencies of ABO and Rh blood groups vary from one population to other and time to time in the same region. Knowledge and distribution of ABO and Rh blood group is essential for effective management of blood bank services at regional level as well as national level. It is, therefore imperative to have information on the distribution of the blood group in their population.^{6,7}

Chhattisgarh state is a high tribal population based state in the center part of India. It is a growing state and tertiary care medical facilities are very limited. Transfusion practices are at primitive stage. Almost 90 % CHC and FRU are not having even blood storage center.

Present study was aimed to identify distribution of ABO & Rh blood group system among the population of northern Chhattisgarh. This information will help to reduce the maternal mortality rate as access to safe and sufficient supply of blood will help significantly in reducing the preventable deaths and improve the Blood transfusion practices of this region.

MATERIAL AND METHOD: The Present retrospective study was carried out at blood bank & zonal blood testing centre of medical college hospital at District Bilaspur of northern Chhattisgarh. Data was collected for 05 years from January 2010 to December 2014 from the Blood group records. Total 31973 subjects were screened for their blood groups. The blood sample was collected in EDTA vacutainer from blood bags after donation. Blood group was performed in Grouping and Cross - matching lab and was entered in blood group register. Blood collected from voluntary and replacement donors were assessed for blood group and recorded in the Blood group register. Blood group test was performed by slide agglutination test by monoclonal blood group AntiSera available commercially i.e. Anti A, Anti B and Anti D human sera. Rare and difficult blood group was re-tested either by test tube agglutination test or Gel matrix technology of Tulip for confirmation. Blood group data analyzed and compare with the data available in the other part of country.

OBSERVATION: In Table – (1) Total 31973 subjects were examined for blood group during observation period, Out of these 31092(97.25%) were male and 881(2.75%) were female. The frequency of blood group B in this population was 11007(34.42%) (33.36 % Rh Positive and 1.06% Rh Negative) Followed by O were 10864 (33.97%) (33.33% Rh Positive and 0.64% Rh Negative), A was 9113(28.50 %) (27.99% Rh Positive and 0.51% Rh Negative) and AB was 989(3.11%) (3.01 % Rh Positive and 0.1% Rh Negative). Rhesus group Rh Positive were 31242(97.7 %) and Rh Negative were 731 (2.3%).

In Table – (2) Frequency of Blood group ABO and Rhesus (Rh) of present study compared with the data available in the other part of India.

ABO Bl. Gr.	Male			Female			Total		
	Rh+ve	Rh-ve	Total	Rh+ve	Rh-ve	Total	Rh+ve	Rh-ve	Total
O	10357 (33.39)	182 (0.56)	10539 (9.95)	301 (0.94)	24 (0.07)	325 (1.01)	10658 (98.1)	206 (1.9)	10864 (33.97)
A	8766 (27.41)	137 (0.42)	8903 (27.83)	184 (0.57)	26 (0.08)	210 (0.65)	8950 (98.2)	163 (1.8)	9113 (28.50)

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B	10404 (32.53)	312 (0.97)	10716 (33.5)	265 (0.82)	26 (0.08)	291 (0.9)	10669 (96.9)	338 (3.1)	11007 (34.42)
AB	911 (2.84)	23 (0.07)	934 (2.91)	54 (0.16)	01 (0.003)	55 (0.16)	965 (97.5)	24 (2.5)	989 (3.11)
Total	30438 (95.19)	654 (2.04)	31092 (97.23)	804 (2.51)	77 (0.24)	881 (2.75)	31242 (97.71)	731 (2.29)	31973 (100)

Table 1: Frequency percentage of ABO and Rhesus blood group in present study.

Population	A	B	AB	O	Rh Positive	Rh Negative
Northern India						
Lucknow	21.73	39.84	9.33	29.10	95.71	4.29
Punjab	21.91	37.56	9.3	31.21	97.3	2.7
Jodhpur	22.2	36.4	9.4	31.7	91.75	8.25
Western India						
Western Ahmadabad	21.94	39.40	7.87	30.79	95.05	4.95
Eastern Ahmadabad	23.30	35.50	8.80	32.50	94.20	5.80
Surat	24.10	34.89	8.69	32.32	94.18	5.82
Maharashtra	23.38	31.89	8.72	30.99	95.36	4.64
Eastern India						
Durgapur(steel City)	23.90	33.60	7.70	34.80	94.70	5.30
Southern India						
Bangalore	23.85	29.95	6.37	39.82	94.2	5.8
Vellore	21.86	32.69	6.70	38.75	94.5	5.5
Davangere	26.15	29.85	7.24	31.76	94.8	5.2
Shimoga-Malnad	24.27	29.43	7.13	39.17	94.93	5.07
Central India						
Bilaspur, Chhattisgarh (Present Study)	28.50	34.42	3.11	33.97	97.7	2.3

Table 2: Frequency percentage of ABO and Rhesus blood group of different area of India⁸

DISCUSSION: Studies available in India shows percentage of male donors are much higher than female donors. Social taboo, cultural habits, lack of motivation and fear of blood donation are the important causes of less female donors.^{9,10} In addition, large numbers of female population are from the menstruating age groups are anemic with low weight, so they deferred from blood donation. In present study only 2.75 % female donors as compare to 97.25 % male donors.

Knowledge of frequency of ABO and Rhesus blood group is an important tool to determine the direction of recruitment of voluntary donors as required for each zone across the country.^{11,12}

In this study frequency of B Blood Group was high 34.42% followed by O Blood group 33.97%, A Blood group 28.50% and Blood group AB 3.11%. Frequency of A,B and O blood group are almost similar or little differ but AB blood group was remarkably less in Chhattisgarh as compare to the study available in other part of India.

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In most part of India Positive Rhesus (Rh) blood group varies from 94 to 97% except in Jodhpur was it approximate 91 %. In present study Rh Positive is 97.7 % and Rh Negative Blood group is 2.3%.^{1,2,8}

Chhattisgarh state is a high tribal population based state in the center part of India. It is a growing state and tertiary care medical facilities are very limited. Transfusion practices are at primitive stage. Almost 90% CHC and FRU are not having even blood storage center. Knowledge of Blood group system helps to take preventive measures in emergencies at FRU, CHC and PHC level and for storage centers to plan the strategies in storing.

CONCLUSION: The present study concludes that in 97.25% male and 2.75 female subjects shows blood group "B" is the commonest blood group i.e. 34.42% followed by "O" 33.97%, "A" 28.50% and "AB" 3.11 %. Rhesus blood group Rh Positive is 97.7% and Rh Negative observed 2.3%. Blood donation in female was very low. Good health education and awareness regarding blood donation can motivate the female. It is necessary to conduct similar well designed studies in other part of India to determine the blood group frequencies. This study will help to make a plan in drafting proper State level and National level Transfusion policies and supplying blood to the needy patients during emergencies.

REFERENCES:

1. Behra R, Joshi YR, Distribution of ABO blood group and Rh(D)factor in western Rajasthan, National Medical Rees 2013; 3: 73-5.
2. Rao C, Shetty JP, Frequency of ABO and Rhesus(D) Blood group in Dakshina Kannada District of Karnataka. NUJHS 2014; 4: 3-57.
3. "Table of blood group system" International Society of Blood Transfusion (ISBT) Oct 2008. Available from URL;<http://igbrl.blood.co.uk/rsbt>.
4. Land Stainer K. Zur Kenntnis der antifermentativen klystischen and agglutinicrenden wirkungen des Blutschrums under lymph Zentralblatt Bakteriologic.1900; 27: 357-62.
5. Von decastella A, Sturli A, Ureber die iso agglutinine in serum pesunder and Kranaker Menschen" Mfiner Med WSchr 1902; 49: 1090-5.
6. Garratty G, Dzik W, Issitt PD, Reid MF, Zelinski T Terminology for blood group antigens and genes histological origin and guideline in the new millennium Transfusion.
7. Mollision PL, The genetic basis of the Rh Blood group system. Transfusion 2000; 34: 539-41.
8. Patel Piyush A, Patel S, Shah J, Oza HV, Frequency and distribution of blood groups in donors in western Ahmadabad. National Journal of Medical Research 2012; 2: 2: 202-06.
9. Mallikarjuna S, Prevalence of ABO and rhesus blood group among blood donors. Indian journal of public health, Research and development 2011.
10. Giri PA, Yadav S, Parhar GS, Phalke DB, frequency of ABO and Rh blood group –A study from a rural tertiary care teaching hospital in India. Int Biol Med Res 2011; 2(4) 988-90.
11. Wadhwa MK, Patel SM, Kothari DC, Pandey M, Patel DD. Distribution of ABO and Rhesus D groups in Gujarat, India a hospital based study. Indian J ped Oncol, 1998; 19(4) 137-41.

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12. Sahu S. Distribution of the ABO blood groups and Rh (D) Factor among the Scheduled caste Population of Punjab. *Anthropologist*, 2003; 5: 203-4.

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