

FREQUENCY OF ABO AND RH (D) BLOOD GROUPS AMONG RECRUITS; RESIDENT OF SURROUNDING AREAS OF DERA ISMAIL KHAN

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ABSTRACT

Objective: To assess the prevalence/frequency of different ABO and Rh (D) blood groups in recruits' resident of surrounding areas of DI Khan Pakistan.

Study Design: Cross-sectional descriptive.

Material and Methods: This study was conducted at Combined Military Hospital (CMH) Dera Ismail Khan from Dec 2017 to Nov 2018. A total of 4941 healthy adult recruits reported to CMH laboratory for their medical examination belonging to surrounding areas of D.I. Khan, were included. Upto 2 ml of blood was taken in the anticoagulant tube, from each recruit. By using commercially available antisera, ABO and Rh (D) blood groups were detected through the tube method. The frequency and percentage of each blood group type were calculated.

Results: Out of 4941 recruits, 1650 (33.4%) were B +ve, 1377 (27.9%) were O +ve, 1107 (22.4%) were A +ve, 372 (7.5%) were AB +ve, 153 (3.1%) were B -ve, 132 (2.7%) were O -ve, 102 (2.1%) were A -ve and 48 (1.0%) were AB -ve.

Conclusion: The most prevalent/frequent blood group, out of ABO and Rh (D) was B +ve. Awareness of different blood groups in the surrounding areas will guide in the effective management of blood banks / volunteer blood donors list.

Key Words: ABO and Rh (D) blood groups, Surrounding areas of DI Khan.

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INTRODUCTION

The most important body fluid is blood, which is essential for circulation all across the body of oxygen, nutrients, and hormones. Almost 33 various blood group systems are identified by International Society of Blood Transfusion [1]. Clinically, the most important "ABO system" was discovered by Karl Landsteiner in 1901 [2]. Almost after 40 years, Rhesus (Rh) blood group system was identified by Weiner and Karl Landsteiner in 1940 [3].

On the basis of appearance of A or/and B antigen in the blood, there are four main blood groups A, B, O, and AB. The A and B antigens are oligosaccharide in nature, expressed on Red Blood Cells, platelets, endothelium, and tissues [4]. The Rh antigens (include D, d, C, c, E and e) expressed on the red blood cell and it's D antigen is a major determinant of Rh system [5]. Under the control of ABO gene expression, the regulation of ABO blood group system takes place [6]. Genes are located on chromosome no. 9 and 1 for ABO and Rh antigens [2,7]. A and B antigens of ABO blood group system are antigenically strong, anti-A and anti-B are naturally occurring antibodies (Abs) found in the serum of persons lacking the corresponding antigen,

these Abs can produce hemolysis in vivo [8]. To avoid morbidity and mortality, a single most important test (ABO blood grouping) is performed in blood banking [9]. The Rh blood group system is involved in hemolytic disease of the newborn, transfusion reactions, and autoimmune hemolytic anemia [10]. Detection of ABO and Rh blood group antigens are being done in routine for blood transfusion, organ transplantation and genetic research (a strong relationship between many diseases and blood groups) [11].

This study was planned to document the various blood groups among the recruits' resident of surrounding areas of DI Khan Pakistan and the prevalence/ frequency of various blood groups in the area.

MATERIAL AND METHODS

This cross-sectional descriptive study was conducted at CMH DI Khan, from Dec 2017 to Nov 2018. A total number of 4941 healthy adult recruits; resident of surrounding areas of DI Khan, between the ages of 18-23 years were included. Approx. 2 milliliters (ml) blood sample was withdrawn from each recruit in a tube containing ethylene diamine tetraacetic acid (EDTA) and by using commercially available ABO antisera and Rhesus monoclonal antisera like CTM (Cam Tech Medical) and Atlas Medical respectively, through direct and reverse tube method, blood groups were detected. IBM SPSS

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Statistic:25 was used to compile and analyze data for the prevalence/ frequency of ABO and Rh (D) blood groups.

RESULTS

Studied recruits were 4941 between the 18 to 23 years of age and descriptive statistics were documented in this study.

Table-1: The number and percentage of residents (studied population) of the surrounding area of DIK.

Name of Cities	No of individuals	Percent (%)
Bakhkar	2028	41.0
Bannu	0240	04.9
Dera Ghazi Khan	0030	00.6
Dera Ismail Khan	0858	17.4
Karak	0045	00.9
Kohat	0018	00.4
Layyah	0108	02.2
Laki Marwat	0459	09.3
Mianwali	0633	12.8
Musa Khel	0006	00.1
North Waziristan Agency	0057	01.2

Peshawar	0024	00.5
South Waziristan Agency	0246	05.0
Tank	0087	01.8
Taunsa	0102	02.1
Total	4941	100.0

Table-2: Frequency & percentage of various blood groups including ABO & Rh (D) among studied recruits.

Blood Groups	Frequency	Percent (%)
A +ve	1107	22.4
B +ve	1650	33.4
O +ve	1377	27.9
AB +ve	0372	07.5
A -ve	0102	02.1
B -ve	0153	03.1
O -ve	0132	02.7
AB -ve	0048	01.0
Total	4941	100.0

Table-3: Corresponding percentage (frequency) of ABO and Rh (D) blood groups in surrounding areas of DI Khan and different area in the world.

S. No	Place	A	B	O	AB	Rh(D) +ve	Rh(D) -ve	Blood Groups Prevalence
1.	Rwp/ lbd [12]	25.52	33.33	31.10	10.04	92.45	07.55	B>O>A>AB
2.	Multan [13]	21.92	36.95	33.80	07.33	92.17	07.83	B>O>A>AB
3.	Skardu [14]	30.62	26.80	26.60	15.98	94.83	05.17	A>B>O>AB
4.	Bangladesh [24]	26.60	23.20	40.60	09.60	96.80	03.20	O>A>B>AB
5.	India [26]	23.85	29.95	39.81	06.37	94.24	05.79	O>B>A>AB
6.	Nepal ²⁷	34.00	29.00	32.50	04.00	96.66	03.33	A>O>B>AB
7.	Present Study	24.47	36.49	30.54	08.48	91.20	08.48	B>O>A>AB

DISCUSSION

Prime importance of transfusion medicine is to know the requirement of blood group prevalence/frequency in the population, especially to maintain blood bank state and volunteer blood donors list. In different population throughout the world, the prevalence of ABO and Rh (D) blood groups differs. To document the frequency/ prevalence of various blood groups in different regions of Pakistan, multiple studies have been carried out. The order of prevalence of various blood groups found in this study matches and relative frequency does not deviate from those which have been documented in other studies conducted on the population of different regions of Pakistan [12-21]. Documented results of this study are almost common and comparable with a study (frequent occurring Blood Group was “B” = 33.3%, next common was “O”

= 31.1%, then “A” = 25.52% and less common was “AB” = 10.04%) conducted on the population of Rawalpindi and Islamabad in 2006 by Khan MS [12], and also similar results obtained in a study (commonly occurring Blood Group was “B” = 36.95%, next common was “O” = 33.8%, then “A” = 21.92% and less common was “AB” = 7.33%) conducted on the population of Multan in 2005 by Mahmood MA [13]. In contrast, the results were obtained in a study (the most frequent Blood Group was “A”, followed by “B”, “O” then “AB”) conducted on the population of Skardu region by Alam M [14]. In various studies conducted on the population of different regions in Pakistan, the Rh (D) positive remained predominant with a frequency of >90% [12-21]. A wide variation in blood groups has been noted in international studies conducted on different populations of the world, the most commonly occurring Blood Group was “O”,

followed by “A”, “B” then “AB” in USA [22], Canada [23], Bangladesh [24] and in Saudi Arabia [25], and the most frequent Blood Group was “O”, next frequent was “B”, then “A” and the least frequent was “AB” in India [26], while frequent occurring Blood Group was “A”, next frequent was “O”, then “B” and the least frequent was “AB” in Nepal [27]. The similarities in our study and in international studies are that the “AB” was least occurred Blood Group and Rh (D) is predominant worldwide.

CONCLUSION

The most prevalent/frequent blood group, out of ABO and Rh (D) was B +ve. Awareness of different blood groups in the surrounding areas will guide in the effective management of blood banks / volunteer blood donors list.

AUTHORS CONTRIBUTION

Muhammad Asif: Statistician

Syed Mohsin Manzoor: Concept and manuscript writing

Maqsood Ahmad: Provision and compilation of data

Muhammad Zahid Younis: Literature review

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