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Research Paper

Distribution of Abo and Rh Blood Groups Among the Medical Students of Career Institute of Medical & Dental Sciences and Hospitals, Lucknow ((U.P.)) in Comparison to Indians and Nationals of Other Countries

Medical Science

KEYWORDS : ABO Blood group, Rh Factor, Male and Female Medical & Dental Students

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ABSTRACT

For the data of ABO blood group and Rh factor, the blood samples were collected from a total of 600 medical & dental students of Career Institutes of Medical & Dental Sciences & Hospitals, Lucknow, out of whom 307 were male students and 293 were female students. The tests were done with the help of sera anti-A, anti-B and anti-D. These values were compared with the standard figures of blood group percentages of Indians and nationals of other countries. In our study, the maximum percentage is of blood group B and minimum percentage is of AB blood group, which tallies with Indian data. The percentage of medical students, both amongst male group and female group closely resemble to national figure of Indians with little difference. Percentage of Rh positive & negative groups also shows almost similar results as of Indian data.

AIMS AND OBJECTIVES:

The purpose of this study was to know about the percentage of ABO and Rh-blood groups amongst medical & dental students of an institute, which is a small group and also to know that to what extent our findings could be compared with data of nationals of other countries.

It is very interesting to know why in different countries and different regions, the percentage of ABO and Rh-blood groups is different, since blood groups study is so much important in Biomedical Science.

INTRODUCTION:

Human red blood cells contain on their surface a series of glycoproteins and glycolipids, which constitute the blood group antigens (Frenk,et al 1997). The development of these antigens is genetically controlled. They appear early in foetal life and remain unchanged until death. On the basis of these antigens, a large number, at least 15 well-defined red cell blood group systems of wide distribution in most social groups have been described (Haslett et al, 2002).

The four major blood group types A,B, AB and O have been classified on the basis of presence or absence of one, both or neither of the antigen A and B. The antigen consists of specific complex carbohydrates that is part of the glycolipids of the plasma membrane (Mittal et al 1998), The person of blood group A consists of antigen A on the surface of RBCs but lacks B-antigen and contains anti-B antibodies in plasma. Likewise person belonging to blood group B has antigen B on RBC's surface and anti-A antibodies in plasma, group AB individual has both A and B antigen RBC's surface and none of the antibodies in the plasma and lastly group O individual lacks both antigens on RBC's surface but contains both types of anti-A and anti-B antibodies in plasma (Thiboofeace and Patton, 1994).

This resulted into discovery of Rh factor by Lovines and Stetson (1939) and also by Landsteiner & Weiner, in 1940 (Jain A.K., 2013; Ganong, 2006). Several subgroups of this Rh blood group have been identified and at least three pairs of alleles, Cc Dd and Ee exist. But the term Rh+ve and Rh-ve is usually applied for presence or absence of antigen D, respectively (Guyton and Hall, 2006; Ranade et al. 1996). It has been observed that the frequency of blood groups in different nationals of world usually varies. Some typical figures show racial and geographical differences in the percentage of different ABO- blood groups and of rhesus-negative (D-ve) blood and have been given in tabular form in Table -I (Jain 2013 ; Guyton and Hall, 2006; Indu Khurana 2013, Mourant et al, 1976; Hughes Jones, 1979; Dacie & Lewis ; 1975 and Pramanik et al, 2001). TABLE – I

(Showing figure of Blood group percentage in Indians and Nationals of some other countries)

S. No	Racial Group	Blood Group Percentage (%)				Rh+ve	Rh-ve
		A	B	AB	O		
1	Indians	21%	39%	09%	31%	93%	07%
2	British (U.K.)	42%	09%	03%	46%	85%	15%
3	U.S.A.	41%	10%	04%	45%	85%	15%
4	Most Europeans	44%	09%	04%	43%	83%	17%
5	South Africans	40%	11%	04%	45%	95%	05%
6	Germans	43%	11%	05%	41%	N/A	N/A
7	Japanese	38%	22%	10%	30%	100%	0%
8	Nepalese	29%	26%	13%	32%	98.5%	1.5%

MATERIAL AND METHODS :

Blood Samples for data of ABO blood groups and Rh-factor were collected from medical students of batch 2011-2012, 2012-2013 and 2013-2014 of Career Institute of Medical Sciences & Hospital, Lucknow (U.P.) & dental students of batch 2010-11, 2011-12, 2012-13, 2013-14 of Career Post Graduate Institute of Dental Sciences & Hospital, Lucknow (U.P.) . Blood groups (ABO & Rh) were determined from blood samples of male & female students with the help of sera anti-A, anti-B and anti-D.The percentage of different blood groups, thus obtained were tabulated in Table -II and compared with data of Indian population and

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also with nationals of other counties as well as an attempt was done to find variation of blood group frequencies amongst male & female medical & dental students of this institution from national figures.

RESULTS :

A total of 307 male & 293 female students were studied for blood group ABO & Rh-factor and the results are made in a tabular form (Table-II) and are compared with Indian data & data of nationals of other countries.

TABLE - II

(Showing figures of Blood group percentage in Medical & Dental students)

Sl. N0.	Group	No. of Medical & Dental Students having different Blood groups (N = 600)			Perc. of Medical & Dental Students having different Blood groups (N = 600)			% of different Blood Groups in Indians	% of different Blood Groups in Europeans
		Male students (N=307)	Female students (N=293)	Total (N= 600)	Male students (N=307)	Groups in Female students (N=293)	Total (N= 600)		
1	A	53	42	95	17.26%	14.33%	15.83%	21%	44%
2	B	133	126	259	43.32%	43.00%	43.16%	39%	09%
3	AB	26	36	62	08.48%	12.29%	10.34%	09%	04%
4	O	95	89	184	30.94%	30.38%	30.67%	31%	43%
5	Rh^{+ve}	288	283	571	93.81%	96.59%	95.17%	93%	83%
6	Rh^{-ve}	19	10	29	06.19%	03.41%	04.83%	07%	17%

1. Table-II shows that ABO & Rh blood grouping has been done on 600 medical and dental students out of whom 307 were male students, and 293 were female students. It is shown by the table that they have 15.83%, 43.16%, 10.34% & 30.67%, percentage belonging to blood group A-, B-, AB- and O- respectively with comparison to Indian data of percentage of blood group A-21%, B-39%, AB-09% and O-31%
2. On categorizing medical & dental students into two groups of male & female students, it is observed that amongst male students, percentage of blood group-A is 17.26%, blood group-B is 43.32%, blood group AB is 8.48% and blood group-O is 30.94% as compared to percentage of blood group amongst female students, i.e. 14.33%, 43%, 12.29% and 30.38% belonging to blood group, A,B,AB and O, respectively.
3. Rh- blood grouping shows that 95.17% of medical & dental students of this institution are Rh+ve and 4.83% are Rh-ve, while Indian figures are 93% Rh+ve, and 7% Rh-ve.
4. Thus, figures of percentage of medical & dental students, both amongst male group and female group closely resemble to national figures of Indians with slightly more difference in percentage of blood groups A & B. Data of Rh- group show close resemblance.

DISCUSSION :

The two most significant blood group systems were discovered by Karl Landsteiner during early experiments with blood transfusion: the ABO group in 1901 (Landsteiner K 1900 & Maliyannar Itgappa, 2011), and in co-operation with Alexander S. Weiner, the Rhesus group in 1937 (Landsteiner K & Weiner AS 1940).

There are racial and ethnic differences in blood type and composition. The ABO blood group system was discovered in 1901. Since then it has acquired an ever-increasing importance in medicine. Most of populations have migrated & mixed. Unfortunately the reliability of the blood data for assessing relationships between population groups is very limited. This is mostly due to lack of availability of this important data. As the Table-1 reveals, the frequency and purity of the four main ABO-blood groups vary in populations throughout the world. A great variation may even occur in different groups within a given country; even in a small country, as one ethnic group mixes, or not, with another.

It has been observed that percentage of blood group distribution in different parts of the world are different depending upon the ethnic origin of the races . Although Nepal is neighbouring country to India, pattern of blood group distribution seems to be different in Nepal than that of India. Nepal's population is a mixture of Tibeto- Nepalese and Indo-Nepalese origin having many ethnic groups. (Pramanik, et al 2001)

South African Indians all belong to group 'O'. The commonest groups in Australia aborigines are 'O' and 'A' in Lapps and in Europeans there is higher frequency of A, while in Africans, B-group is much common (Maliyannar Itgappa, et al 2011).

In people of Ahmedabad region of India, most predominant blood group is B (36.5%), followed by O (30.5%), A (21%) and AB (12%)- (Hina S Mod et al, 2013) , which shows different percentages as compared to our results.

The frequency with which blood group types are observed is determined by the frequency with which three alleless of the ABO gene are found in different parts of the world. Variation in this allele frequency of ABO gene reflects the social tendency of populations to marry and reproduce within their national, regional or ethnic group. As people throughout the world intermingle to a greater degree, the distribution of the different blood group types will continue to become more uniform. Red cell antigens are the phenotypical expression of our inherited genes. One of the most common question that we get is about the ethnic and racial distribution of human blood groups. In response following, here is our collection of basic ABO-blood group and Rh factor data, amongst male & female medical students of an institution.

In our study, it can be seen that ABO-blood group of medical students of an institution viz. Career Institutes of Medical & Dental Sciences and Hospitals, Lucknow more or less tally to the given Indian national data, with little difference. Male medical students also show data of different blood groups of ABO & Rh system figures very close to figures of Indians. Female medical students also show the data of blood group A, B, AB, O as well as

Rh^{+ve} and Rh^{-ve}, closely resembling with Indian data. The maximum percentage is of blood group-B and minimum percentage is of blood group-AB, which also tallies with Indian data. Figures show that Rh-blood group also tally with national values, with slight difference.

CONCLUSION :

Thus, it is observed that even by studying a small group of people such as medical & dental students of one institute, also after categorizing into male & female groups separately, the percentage of ABO-blood groups and Rh-system closely resemble to the national figures of India, with slight difference.

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