



FREQUENCY DISTRIBUTION OF ABO, RH BLOOD GROUPS AMONGST THE POPULATION OF UTTAR PRADESH

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ABSTRACT

Objective

To document the frequency of ABO & Rh (D) blood groups in the population of Uttar Pradesh.

Method

A total of 15,670 individuals of Uttar Pradesh were studied, collected from the records of hospitals and students of various medical colleges of Uttar Pradesh. A finger prick blood sample of both genders was tested for ABO and Rh (D) blood groups by routine slide method.

Results

Blood group 'B' was dominant (35.66%) in both Rh⁺ and Rh⁻ subjects. The percentage of Rh⁺ and Rh⁻ subjects was 95.76% and 4.24% respectively.

Conclusion

the frequency of ABO blood groups in both Rh⁺ and Rh⁻ subjects in Uttar Pradesh was B>O>A>AB. Rh⁺ blood group was much more common than Rh⁻ blood group.

KEY WORDS ABO, Rh, blood groups.

INTRODUCTION

Human population genetics is primarily concerned with the study of the nature of the biological variations in human population which in turn will help us in understanding the nature and process of the ongoing evolution. India with its vast amount of diversity presents a unique opportunity to delineate human variation based on sociocultural, linguistic, ethnic and geographical criteria. Immunological properties of red blood cells generally described as blood groups. The vast interest arising out of a blood group lies in the fact that the character of the ABO, Rh blood groups is exclusively an integrally heritable, genetically determined at conception of life and remains fixed for life. Hence its frequency distribution follows a known pattern governed by gene transmission from generation, and varies with the race and geographical distribution of human beings.

Summarising the distribution of ABO polymorphism in Indian populations, Bhasin & Walter (2001) observed that the frequency of allele ABO*B predominates ABO*A with general frequency of 0.233 and 0.186 respectively with an exception of eastern Himalaya region. An increase in ABO*A and ABO*B and decrease in ABO*O allele frequency from South to North of India is also reported by them.⁽¹⁾

The local figure on the frequency of the ABO blood groups amongst the population of Uttar Pradesh has not been available. In this study, an attempt has been made to study blood group systems ABO and Rh among the population of Uttar Pradesh, India.

Material & Methods

Subjects: over the period of one year, a total of 15,670 subjects of both genders were collected from the records of blood bank (retrospective data) and students of M.B.B.S, B.D.S, nursing & paramedical sciences (prospective data) of Rama Educational Society, Kanpur; G.S.V.M Medical College, Kanpur; Teerthanker Mahaveer Medical College & Research Center; Moradabad and Hindustan institute of Medical Sciences, Greater Noida. The details of each subject such as name, age, sex etc. were collected using a brief questionnaire.

Ethical consideration: The protocol was admitted by Physiology Department, Rama Medical College, Hospital & Research Center Kanpur for collection of retrospective data. For prospective data three sheets were given to each student who accepted to participate in study (finger puncture form, finger prick consent and questionnaire), the first sheet was a declaration from each participant that s/he understood every word about the project, the second included information about the procedures and the last sheet was a brief questionnaire that included demographic data related to the participants.

Collection of blood sample: The blood samples were collected by finger prick with sterile needle.

Procedure: A drop of monoclonal anti-A, anti-B and monoclonal/polyclonal anti-D (ERYCLONE, TULIP DIAGNOSTICS (P) LTD; Goa, India) was added to a drop of finger prick blood on a clean slide and mixed well. Results for agglutination were recorded immediately for ABO blood groups and after 2 minutes in Rh (D).

Result & Discussion

15,670 subjects were randomly selected from various medical colleges of Uttar Pradesh. They consisted of 6,135 females and 9,535 males between ages 16-50 years. The frequency of distribution of the blood groups A, B, AB and O is shown in the table I. It was observed from the table I that the blood group B occurs with highest frequency and blood group AB occurs with lowest frequency in both males and females.

| sex | A | B | AB | O | Total |
|--------|------------------|------------------|--------------|------------------|------------------|
| Male | 1993 (12.72%) | 3400 (21.70%) | 782 (4.99%) | 3360 (21.44%) | 9535 (60.85%) |
| Female | 1446 (9.22%) | 2188 (13.96%) | 742 (4.74%) | 1759 (11.23%) | 6135 (39.15%) |
| Total | 3439 (21.94%) | 5588 (35.66%) | 1524 (9.73%) | 5119 (32.67%) | 15670 (100%) |

Table I ABO blood group distribution among the male and female subjects

The frequency of Rh blood group is shown in table II. It was observed that Rh⁺ blood group is much more common than Rh⁻ blood group.

| Sex | Rh ⁺ | Rh ⁻ | Total |
|--------|-----------------|-----------------|---------------|
| Male | 9027 (57.61%) | 508 (3.25%) | 9535 (60.85%) |
| Female | 5978 (38.15%) | 155 (0.99%) | 6135 (39.15%) |
| Total | 15005 (95.75%) | 665 (4.24%) | 15670 (100%) |

Table II Rh blood group distribution among the male & female subjects

| Blood group | Rh ⁺ | Rh ⁻ | Total |
|-------------|-----------------|-----------------|---------------|
| A | 3361 (21.45%) | 80 (0.5%) | 3439 (21.95%) |
| B | 5315 (33.92%) | 273 (1.74%) | 5588 (35.66%) |
| AB | 1446 (9.23%) | 78 (0.49%) | 1524 (9.73%) |
| O | 4885 (31.17%) | 234 (1.49%) | 5119 (32.66%) |
| Total | 15045 (95.76%) | 665 (4.24%) | 15670 (100%) |

Table III Rh group distribution among ABO blood group individuals

Table III shows the distribution of Rh⁺ and Rh⁻ blood groups among the four ABO blood groups. Rh⁺ group is more common than the Rh⁻ group in all the four blood groups. Group B⁺ is the highest with percentage frequency of 33.92% which is followed by group O⁺ with the percentage frequency of 31.17%, blood group A⁺ is 21.45% and AB⁺ 9.23%.

Over many years, the Rh blood group systems has been distributed among any population to keep the frequency of Rh⁻ very low since clinical situations could arise through Rh blood incompatibility. Similar pattern of distribution is also observed in other studies. Rh⁻ blood group is documented as 5% in Nairobi⁽²⁾, 4.5% in Nigeria⁽³⁾ and 7.7% in Rawalpindi studies⁽⁴⁾. No recent study is found in Uttar Pradesh area.

The importance of the knowledge of the blood groups in regards to the health of an individual is enormous. The different types of information are useful for medical diagnosis, genetic counselling and also for general wellbeing of individuals.

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