

# Blood Group Typing of Students from Various Social Groups of Kumaun Region, Uttarakhand, India

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## ABSTRACT

**Introduction:** Blood group information is an integral part of clinical diagnosis using various haematological techniques to understand haematological disorders. Simultaneously, it is mandatory to have clear information on blood groups in case of blood transfusion and related matters. It is important to have complete history of the patients and the subjects including establishment and maintenance of blood banks.

**Aim:** The aim was to study the clinical and physiological manifestations of blood group typing in social groups.

**Materials and Methods:** The present observational study was carried out in four districts (Nainital, Champawat, Pithoragarh and Udham Singh Nagar) of Kumaun region of Uttarakhand, India from March 2018 to March 2019 to record the blood group of students from randomly selected schools and colleges. The

collected numerical data was statistically analysed in the form of bar diagram by using Microsoft Excel software.

**Results:** The present survey was carried out during the year 2018 in the colleges, covering 1073 students to understand the blood groups. During the investigation, the majority of students exhibited B<sup>+</sup> (242) followed by O<sup>+</sup> (237), A<sup>+</sup> (208), AB<sup>+</sup> (121), O<sup>-</sup> (15), B<sup>-</sup> (9), A<sup>-</sup> (8) and AB<sup>-</sup> (7) respectively. There were 226 students who refused to give blood sample for blood group typing due to fear and other unexplained reasons. O<sup>+</sup> (237) and B<sup>+</sup> (242) blood groups were observed as most common blood groups and AB<sup>-</sup> blood group was found only in seven students.

**Conclusion:** The present study yielded information basically on blood group pattern across the population and it can be used by blood donation blood bank societies for collection of blood from various groups.

**Keywords:** Haematology, Social group, Students

## INTRODUCTION

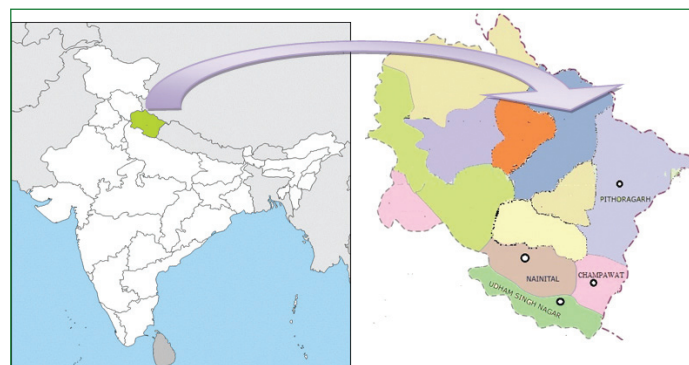
Human blood is an important tissue to human beings and small alteration in the blood parameters indicates the overall health of an individual this is the only tissue which can be transfused into the human body easily and instantly, but it needs information about the blood group of an individual. The blood groups vary markedly in different races and ethnic groups across the world [1,2]. The differences in human blood group are due to certain antigen and antibodies. The antigens are located on the surface of the Red Blood Cells (RBC) and the antibodies are in the blood plasma [3,4]. Individuals have different types and combinations of these molecules. Blood corpuscles have a variety of chemicals on their surfaces called antigens [5,6]. Blood corpuscles from different people have different antigens which depend on the genetic makeup of an individual. The blood grouping is usually done by agglutination of RBCs [7].

Blood group typing contributes significantly in blood banking services and blood transfusion in case of accidents and other emergencies [8,9]. It is therefore imperative to have information on the distribution of these blood groups in the population [10]. Knowledge of blood group distribution is also important for reliable geographical information and helpful in reducing the mortality rate, as access to safe and sufficient supply of blood will help significantly in reducing the preventable death incidence [11,12]. There are very few reports on the diversity of blood groups in the mixed population of the Kumaun region. The present study was an attempt to understand the most common blood groups in the selected population group of school and college students to understand the distribution pattern of various blood groups among them.

## MATERIALS AND METHODS

The observational study was conducted in four districts (Nainital, Pithoragarh, Champawat and Udham Singh Nagar) in the Kumaun

region of Uttarakhand, India from March, 2018 to March, 2019 [Table/Fig-1,2].



[Table/Fig-1]: Map of India depicting Uttarakhand.

[Table/Fig-2]: Map of the study area. (Images from left to right)

A total of 1073 students from 23 colleges, where 847 participated in the blood grouping and 226 individuals either were aware or denied for the sample for the investigation. Blood groups were recorded considering the social groups in terms of general (446), Scheduled Caste (SC) (251), Scheduled Tribes (ST) (27) and Other Backward Classes (OBC) (123). A total of 21.06% students either did not respond or denied to provide any information about their blood groups. Therefore, it is very important to have information on the distribution of these blood groups in any population group.

## Blood Group Analysis

Blood grouping was performed at the research site using Spanclone Anti-A+B+D (Rh0) monoclonal diagnostic kit, following standard protocol. First of all, a clean glass slide was taken and three circles were drawn on it and one drop of blood was put in each circle. Pressure was applied on the site where it was pricked to stop blood

flow. Cotton ball was used if required. In the first circle Anti-A was added, to the second circle Anti-B and to the third circle Anti-D was added with the help of a provided dropper. The blood sample was mixed gently with the help of a toothpick and after one minute, blood coagulation was observed.

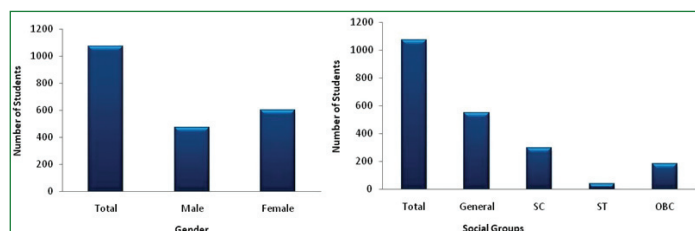
### STATISTICAL ANALYSIS

The collected numerical data was statistically analysed in the form bar diagrams by using Microsoft Excel software.

### RESULTS

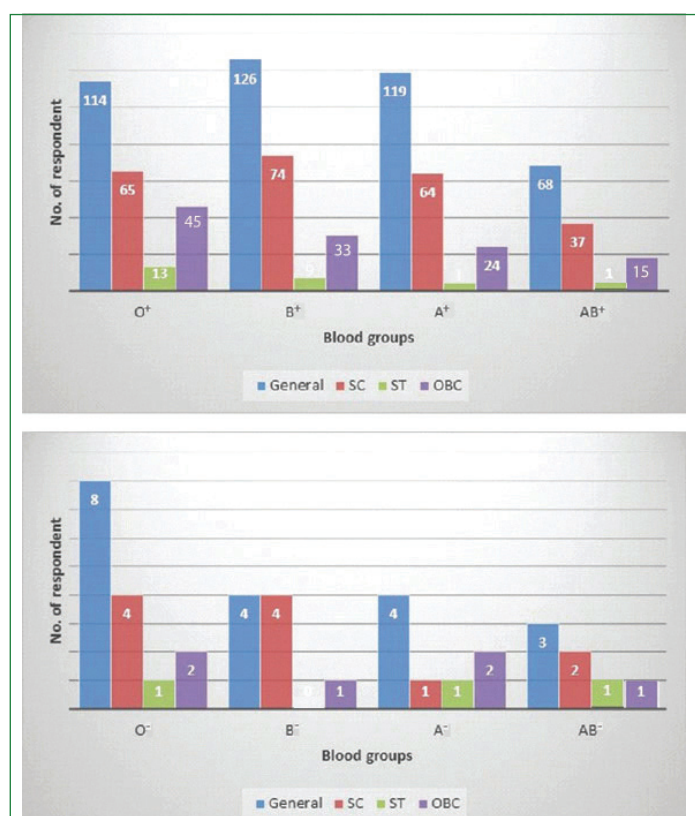
The present study yielded very significant information on diversity of blood group among college students across the society. The most dominant blood group observed was B<sup>+</sup> (28.57), followed by O<sup>+</sup> (27.98), A<sup>+</sup> (24.56%), AB<sup>+</sup> (14.29%), O<sup>-</sup> (1.78%), B<sup>-</sup> (1.06%), A<sup>-</sup> (0.94%) and AB<sup>-</sup> (0.82%), respectively.

Number of females (601) were more than males (472) in the total numbers of student participated (1073) [Table/Fig-3]. The blood group diversity was analysed across the castes and within the castes and the data revealed that O<sup>+</sup> blood group was most common in the population and within castes. Similarly, Rh<sup>-</sup> blood groups were also analysed in the population and within the castes.

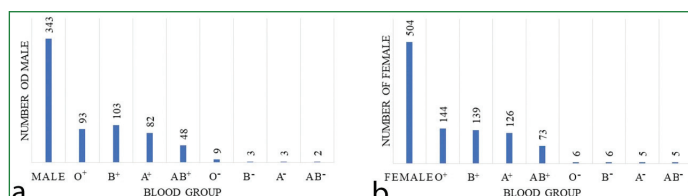


[Table/Fig-3]: Social distribution of students who participated in the study.

Seven cases of AB<sup>-</sup> were observed and other blood groups like B<sup>-</sup>, A<sup>-</sup> accounted for around 1% of each, followed by O<sup>-</sup> (1.78%) only [Table/Fig-4]. The gender based distribution of blood groups deciphered that the trend is almost similar in blood grouping among male and females; the findings of the study are summarised in [Table/Fig-5].



[Table/Fig-4]: The bar graph is showing the distribution of blood groups in social groups in respondent.



[Table/Fig-5]: Blood group frequency in male a) and female b) students.

### DISCUSSION

Apart from their importance in blood transfusion practice, the allelic frequency in blood groups is useful in population genetics, genetic counselling, evolutionary biology, molecular ecology studies including human migration patterns and basic paternity and maternity disputes [13]. Allelic frequency of blood groups vary widely among the social groups and within the geographical boundaries [14,15]. During the present investigation, differences in the distribution of allelic frequency of blood groups has been noted. Few studies on the prevalence of allelic frequency of blood groups have been carried out in the Indian population and most of these studies are limited to individual communities of the country [16].

The findings of this study revealed a scattered distribution of blood groups in four districts of Kumaun, Uttarakhand among various social groups. The blood group B<sup>+</sup> was the most common in the students, followed by O<sup>+</sup>, A<sup>+</sup>, AB<sup>+</sup>, O<sup>-</sup>, B<sup>-</sup>, A<sup>-</sup> and AB<sup>-</sup> respectively. The trend in percentage distribution of B<sup>+</sup> was 28.57%, 27.98% followed by O<sup>+</sup> (27.98), A<sup>+</sup> (24.56%), AB<sup>+</sup> (14.29%), O<sup>-</sup> (1.78%), B<sup>-</sup> (1.06%), A<sup>-</sup> (0.94%) and AB<sup>-</sup> (0.82%), respectively. The present study is limited to a small group of students from Kumaun region and it could be replicated in other areas too [17]. According to a study, blood group information is required for inventory management of blood banks and blood transfusion services for indoor patients as well as emergency supply to hospitals in any state [18]. Garg P et al., studied the distribution pattern of the ABO and Rh blood groups among blood donors in the Kumaun region of Uttarakhand and aimed to carry out a similar study in Government Colleges for blood group analysis [19]. College Blood Grouping (CBG) studies are the need of the hour to frame better healthcare and well-organised health services, especially during emergency circumstances.

### Limitation(s)

One of the major limitations noted was the unequal distribution of cases in study groups. It might be because the 1073 students included were not sub-divided initially and the colleges were randomly selected. The groups were split based on caste and gender due to the availability and unavailability of respondents.

### CONCLUSION(S)

The present observation concludes that the most common blood groups were B<sup>+</sup> (28.57%), O<sup>+</sup> (27.98%), and the least common is AB<sup>-</sup> (0.82%), respectively amongst the respondents. Blood group O and B showed almost frequency. Female respondents were high in comparison to males. The study yielded information on blood group patterns across the population and it can be used by blood donation bank societies for collection of blood from various groups. Many colleges and schools need their student's blood group on their identity card and on admission form. In case of an emergency, it would be difficult to provide rare blood group transfusion facility to the patient and those individuals who are in need. The present study can be conducted on a larger sample size, adding more haematological parameters to understand basic health conditions and allelic frequency of various blood groups.

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