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PREVALENCE OF ABO BLOOD GROUPING AND RH TYPING AMONG UNDERGRADUATE ALLIED HEALTH SCIENCE STUDENTS AT MEENAKSHI ACADEMY OF HIGHER EDUCATION AND RESEARCH

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ABSTRACT

The present study analyzed the distribution of ABO and Rhesus (Rh) blood groups among 100 undergraduate students of the Faculty of Allied Health Sciences, MAHER. Demographic data, including gender and age, were collected and examined. The study population consisted of 65% females and 35% males, with the majority (52%) belonging to the 21-year age group. Analysis of ABO blood group distribution revealed that O Positive was the most common blood group among females, followed by B Positive and A Positive. Among males, B Positive (37%) was most prevalent, followed by O Positive (28%) and A Positive (25.7%). Rare blood groups such as AB Negative, A Negative, and O Negative were observed at very low frequencies.Rh typing showed a clear predominance of Rh-positive individuals (93%) across the study population, with 94% of males and 93% of females testing Rh positive. Only 7% of the overall participants were Rh negative.In conclusion, O Positive emerged as the most frequent blood group, whereas AB Negative was the least common. The predominance of Rh positivity across both genders aligns with previously reported regional trends in South India. These findings contribute to the existing knowledge on blood group prevalence, with implications for transfusion safety, donor awareness, and population genetics.

Keywords: ABO blood group, Rhesus factor, Prevalence, blood group distribution, South India

INTRODUCTION

Blood is a vital connective tissue that sustains life by transporting oxygen and nutrients to tissues while removing metabolic wastes. It also plays essential roles in homeostasis, immunity, and overall well-being. Clinically, blood is indispensable in trauma care, surgery, obstetrics, and oncology, where safe transfusion remains a life-saving intervention.

Ensuring transfusion safety requires accurate knowledge of blood groups for both donors and recipients, as incompatibility can result in severe and sometimes fatal reactions. Blood groups are classified based on antigens present on the red blood cell (RBC) membrane, of which the ABO and Rhesus (Rh) systems are the most clinically significant. The ABO system, discovered by Karl Landsteiner in 1900, categorizes blood into four groups—A, B, AB, and O—according to the presence or absence of A and B antigens and their corresponding antibodies (1). The Rh system, identified in 1940, is determined primarily by the presence of the D antigen, which is highly immunogenic and clinically important in transfusion medicine and obstetrics, particularly in cases of hemolytic disease of the newborn (HDN) (2,3).

Although the International Society of Blood Transfusion (ISBT) recognizes 47 blood group systems comprising 366 antigens as of October 2024 (4), the ABO and Rh systems remain the most relevant in clinical practice. Knowledge of blood group distribution is crucial for the effective management of blood banks, transfusion services, and organ transplantation. Beyond clinical practice, blood group analysis is also valuable in forensic medicine for personal identification and in establishing biological relationships, as blood types are genetically inherited(5-11)..

The present questionnaire-based study was conducted to assess the prevalence and distribution of ABO and Rh blood groups among students of the School of Allied Health Sciences, Meenakshi Academy of Higher Education and Research (MAHER), Kancheepuram.

MATERIALS AND METHODS

This descriptive cross-sectional study with a quantitative observational design was conducted among 100 undergraduate students of the School of Allied Health Sciences, Meenakshi Academy of Higher Education and Research (MAHER), Kancheepuram. The study population included students aged 18–22 years, both male and female. Students unwilling to participate were excluded from the study. The study was carried out at Meenakshi Medical College Hospital and Research Institute (MMCH&RI), MAHER over a period of three months (June–August 2025).

Institutional Ethical Committee clearance was obtained prior to the commencement of the study (IEC Approval No: MMCH&RI/UG/AHS/10/MAY/25). Participants were approached within the campus, and the objectives of the study were clearly explained to them. Written and/or verbal informed consent was obtained from each participant. A structured questionnaire was administered to collect demographic details, health-related information, and self-reported ABO and Rh blood groups.

All collected data were arranged, tabulated, and analyzed using Microsoft Excel. The results were expressed in terms of frequencies and percentages to determine the prevalence and distribution of ABO and Rh blood groups among the study population.

RESULTS

The study population comprised 100 participants from the School of Allied Health Sciences, MAHER. Demographic information was systematically collected, tabulated, and analyzed. Among the participants, 65% were female and 35% were male (Figure 1), indicating a higher proportion of female representation in the study cohort

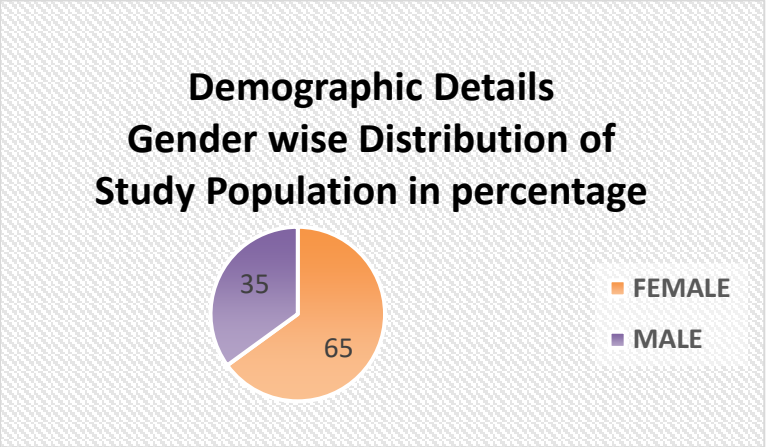

Figure 1: Represents the Demographical details of study population. The values are represented in percentage.

The age distribution of the participants showed (Table 1) that the majority were 21 years old (52%), followed by those aged 20 years (28%), 22 years (22%), and 19 years (18%).ABO Blood Grouping

AGE	PRECENTAGE IN STUDY POPULATION
19	18
20	28
21	52
22	22

Table 1: Represents the Age-wise distribution of the participants

Prevalence of Blood Groups among Female and Male Participants was evaluated. Among female participants, the most frequently observed blood group was O Positive, followed by B Positive and A Positive. Rare phenotypes such as AB Negative, B Negative, and AB Positive were detected at very low frequencies, indicating a predominance of O and B groups in the female cohort (Figure 2). In contrast, among male participants, the most prevalent blood group was B Positive (37%), followed by O Positive (28%) and A Positive (25.7%). The least common groups were O Negative, AB Positive, and A Negative, each representing approximately 2.8% of the male population (Figure 3). These findings highlight the predominance of B and O blood groups among males in the study population.

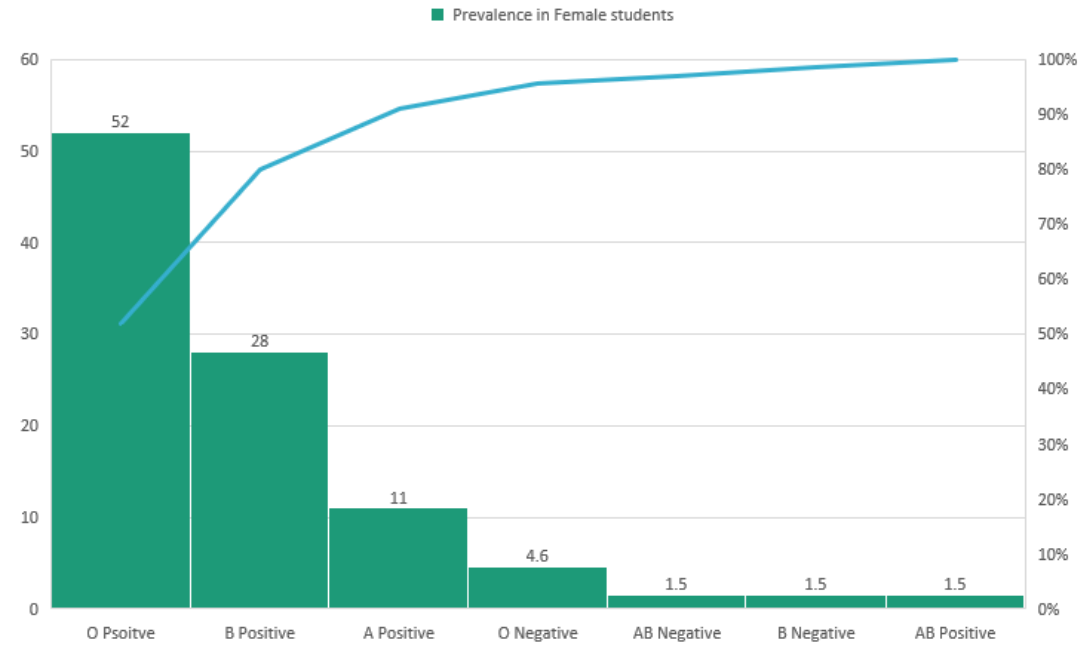

Figure 2: **Prevalence of Blood Groups among Female Participants**

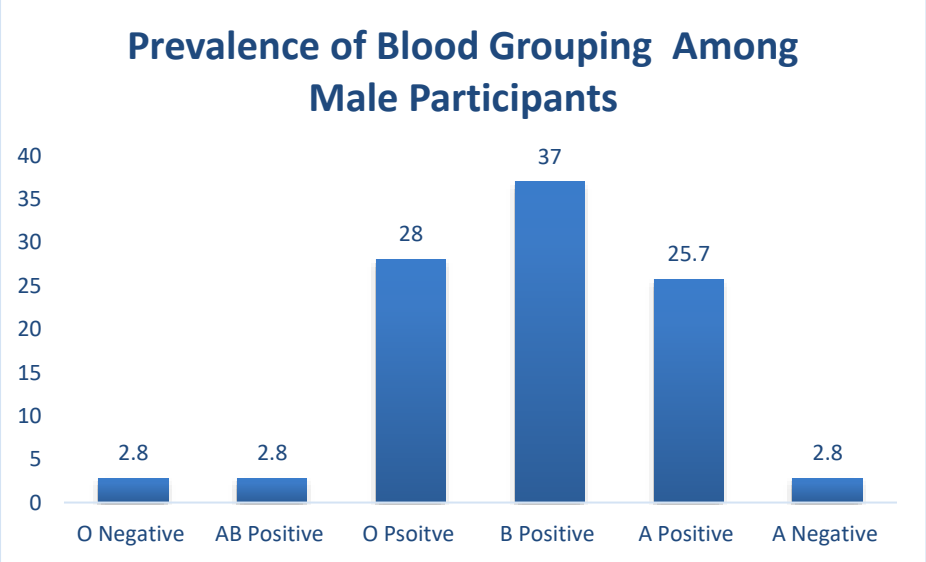

Figure 3: Prevalence of Blood Groups among Male Participants

The overall Rh typing revealed that 93% of participants were Rh positive, whereas 7% were Rh negative (Table 2). Among females, 93% were Rh positive and 7% were Rh negative (Table 3). Similarly, in males, 94% were Rh positive and 6% were Rh negative. These results demonstrate a consistent predominance of Rh positivity across both genders, with only minimal variation observed.

GENDER	Rh +ve cases in %	Rh –Ve cases in %
Male	33	2

Female	60	5
	93	7

Table 2: Overall distribution of Rh blood group among study participants

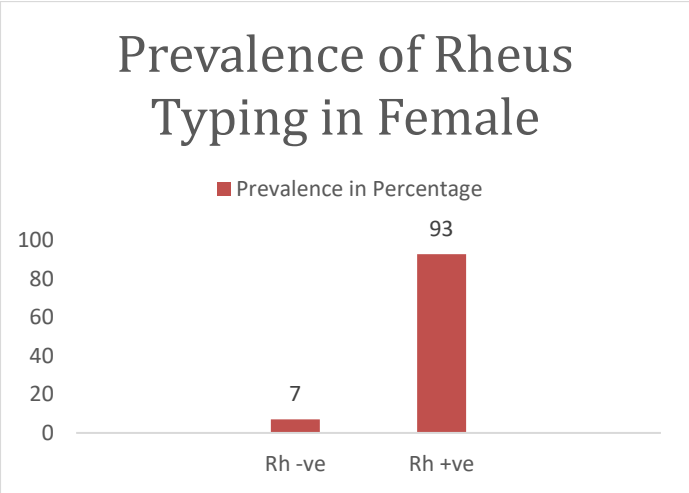

Figure 4: Prevalence of Rh typing in female. The values are represented in percentage

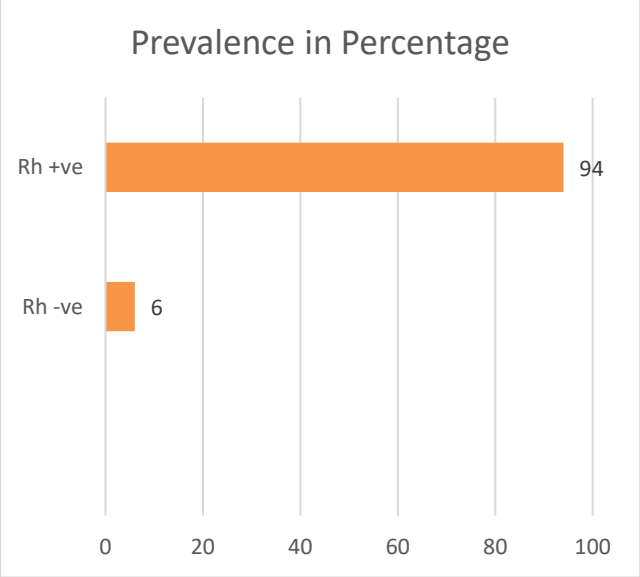

Figure 5: Prevalence of Rh typing in Male. The values are represented in percentage

DISCUSSION:

The study population consisted of 100 participants, and their demographic details were collected and analyzed. Gender distribution showed that 65% of the participants were female, while 35% were male. With respect to age, 18% of the participants were 19 years old, 28% were 20 years old, 52% were 21 years old, and 22% were 22 years old, indicating that the majority belonged to the 21-year age group. Analysis of the ABO blood group distribution revealed that among females, the most prevalent type was O Positive, followed by B Positive, A Positive, and O Negative, with rare groups such as AB Negative, B Negative, and AB Positive occurring at very low frequencies. Among males, B Positive was the most common blood group (37%), followed by O Positive (28%) and A Positive (25.7%), while O Negative, AB Positive, and A Negative were the least common, each accounting for approximately 2.8% of the male participants. Overall, these findings suggest a predominance of O and B groups across the cohort, with B group being more frequent among males. Rhesus typing showed that 93% of the total participants were Rh positive, while 7% were Rh negative. A similar trend was observed in both genders, with

93% of females and 94% of males being Rh positive, and only 7% of females and 6% of males being Rh negative. These results demonstrate a consistent predominance of Rh positivity across the study population.

CONCLUSION

This study demonstrated that the majority of participants were females, with most belonging to the 21-year age group. *O* and *B* emerged as the predominant blood groups, while Rh positivity was observed in 93% of the cohort, closely aligning with national and global patterns.

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