

Association Between ABO Blood Groups and Big Five Personality Traits in Healthy Young Adults: A Cross-sectional Study

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ABSTRACT

Introduction: The pursuit of optimal health is a universal human aspiration. This ideal state can be conceptualised as a harmonious interplay between external and internal health. While numerous factors contribute to an individual's health profile, the potential influence of blood type on these aspects remains a topic of ongoing exploration. The present research project delves into this question, aimed to elucidate the relationship between the ABO blood group system and personality traits in healthy young adults.

Aim: To categorise young adults aged between 18 and 25 years according to ABO blood groups and to analyse the association between personality traits and varying blood groups.

Materials and Methods: The present cross-sectional study was carried out on 187 healthy young medical students of both genders aged between 18 and 25 years at Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India, between June 2024 and May 2025. Subjects were categorised into different groups based on their ABO blood grouping using the slide agglutination method, while personality traits were assessed using the Big Five Personality Questionnaire.

Comparisons were made between blood group, personality traits, and gender. Statistical analysis was performed using the Chi-square test in Statistical Package for the Social Sciences (SPSS) version 22.

Results: The study population had a mean age of 20.05±1.08 years. In terms of gender distribution, females and males constituted 128 (68.4%) and 59 (31.6%) participants, respectively. Both genders showed a higher association with the openness personality type, while females exhibited a wider variation in personality traits ($p=0.042$). Analysis of ABO blood grouping revealed that most subjects belonged to the O blood group. A statistically significant association was observed between ABO blood group and personality type ($p=0.038$), with individuals having A, B, and O blood groups predominantly exhibiting the openness personality type, while those with the AB blood group tended to show the agreeableness personality type.

Conclusion: The current body of research presents mixed findings regarding the relationship between blood groups and personality traits. Further studies with larger sample sizes and more rigorous methodologies are needed to clarify these associations.

Keywords: Behavioural science, Genotypic correlation, Psychological profiling, Temperament, Trait analysis

INTRODUCTION

The ABO blood group system is determined by the presence of A and B antigens on the surface of red blood cells and by the presence of anti-A or anti-B antibodies in the serum. These antibodies are typically of the Immunoglobulin M (IgM) type and are not present at birth but appear during the first year of life. Human ABO genes are located on chromosome 9q34.1-q34.2 and consist of seven exons distributed across 18 Kilobases (kb) of genomic DNA. Exon 7 contains the majority of the coding sequence, while exon 6 contains the deletion found in most O alleles. The exons range in size from 28 to 691 base pairs [1-3].

Personality is a relatively stable combination of traits, attitudes, interests, behaviours, and emotions that develop through interaction with the environment. These personality traits influence various aspects of both normal and pathological behaviours and are closely linked to temperament, forming the core of human personality. Personality serves as the organising force of human behaviour and holds significant importance in psychology. It comprises multiple dimensions or factors that influence how individuals respond to different situations. Physical and mental health can be studied in relation to personality traits [4-7].

The present study aimed to explore the possible association between ABO blood groups and personality traits in a population of healthy young adults using the Big Five personality framework. By focusing on this group, the research seeks to add to the limited empirical evidence on the biological correlates of personality and contribute to the ongoing discussion in this field. Through

this focused investigation, the study endeavours to uncover any meaningful connections between the ABO blood group system and personality characteristics.

Human personality, a multifaceted construct encompassing thoughts, emotions, and behaviours, has long attracted scientific interest. While genetics, environment, and upbringing undoubtedly play major roles, the potential influence of lesser-explored factors such as blood type remains intriguing [5,7,8]. The ABO blood group system, being a stable genetic trait, provides a unique opportunity to examine possible associations with personality characteristics. Despite popular interest, scientific evidence supporting a definitive link between blood groups and personality remains inconclusive [1,4,6,9-12].

Conversely, several studies, such as those conducted by Alsadi R among Palestinian university students and by Nahida A and Chatterjee N using the Eysenck Personality Questionnaire-Revised (EPQ-R), found no significant relationship between blood groups and personality traits. These discrepancies may arise from differences in sample size, population characteristics, and assessment methods [4,5].

Alongside external health, internal health plays a crucial role in maintaining overall well-being. Internal health is rooted in mental well-being, which is strongly influenced by personality traits. The novelty of the present research lies in its specific focus on personality traits within a controlled population. By studying healthy young adults, the influence of confounding factors related to age and disease can be minimised, allowing a more precise

examination of the potential relationship between ABO blood groups and personality.

Although personality development is shaped by numerous psychological and environmental factors, the influence of biological determinants such as blood group warrants further exploration. Therefore, the present study was conducted to provide insights into the potential interplay between blood type and personality by categorising young adults aged 18-25 years according to ABO blood groups and analysing their association with personality traits.

MATERIALS AND METHODS

The present cross-sectional study was conducted in the Department of Physiology at Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India, between June 2024 and May 2025. After approval of the study protocol by the Institutional Ethics Committee (Ref No: 9/24/IEC/JMMC&RI), the study was explained to all participants, and written informed consent was obtained.

Inclusion criteria: A total of 187 healthy young medical students of both genders, aged between 18 and 25 years, were included in the study.

Exclusion criteria: Subjects with a history of genetic or chromosomal abnormalities such as Down syndrome, Fragile X syndrome, and related conditions were excluded.

Sample size calculation: Based on the results of a previous study titled "Relationship of blood group with body fat percentage, visceral fat, and waist-hip ratio", with a 95% confidence level and 15% relative allowable error, the minimum sample size calculated was 160 [13].

$$n = \frac{(z1 - \alpha/2)^2 \times p \times q}{d^2}$$

$$z1 - \alpha/2 = 1.96$$

$$p = 52\%$$

$$q = 100 - p$$

$$d = 15\% \text{ of } p$$

Study Procedure

Data collection: Blood grouping was performed using diagnostic reagents obtained from Span Diagnostics Ltd. (Spanclove), following standard laboratory procedures. Personality assessment was carried out using the 44-item Big Five Inventory (BFI), a validated questionnaire designed to measure personality across five major dimensions: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience [8].

After explaining the study procedure and obtaining informed consent, blood samples were collected by finger prick. Blood typing was then performed using the slide agglutination method [6]. The blood group was determined by observing the reaction between red blood cells and serum containing known agglutinins. Participants were classified into A, B, AB, and O blood groups based on the presence or absence of agglutinogens A and B on red blood cells [14].

Personality type: Personality traits were evaluated using the 44-item BFI, which measures five major personality dimensions as described by Goldberg (1993). Each dimension consists of multiple personality facets [6,15].

The Big Five personality trait: The five fundamental personality traits assessed were extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience.

Data for personality assessment were collected using a Google Form questionnaire distributed via email to all participants. A total of 206 forms were sent, and 187 completed responses were received. Prior instructions and guidance on completing the questionnaire

were provided to ensure clarity and consistency in responses. Participants submitted their responses directly through the form. Those who did not initially respond were reminded through email or phone calls. Each participant was given one day to complete and submit the questionnaire.

Participants were instructed to answer the questionnaire in the order presented in the Google Form. Each item was rated on a five-point Likert scale:

1. Strongly disagree
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Strongly agree

Responses were scored from 1 to 5 accordingly. Positively worded items were scored directly, while negatively worded items were reverse scored ("R" indicates reverse-scored items):

- Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36;
- Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42;
- Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R;
- Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39;
- Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44.

Scores for each dimension were summed. The personality trait with the highest total score was considered the dominant personality trait of the participant.

STATISTICAL ANALYSIS

Data were analysed using SPSS version 22. Results were presented in tabular form. Associations between variables were evaluated using the Chi-square test. A p-value of <0.05 was considered statistically significant, and <0.01 was considered highly significant.

RESULTS

The present study assessed the association between ABO blood groups and personality traits among 187 healthy young medical students aged 18-25 years, comprising 59 males and 128 females. [Table/Fig-1] presents the demographic characteristics of the participants. Females constituted a higher proportion (68.4%) compared to males (31.6%). The mean age of the study population was 20.05±1.08 years. All participants were undergraduate students and reported no comorbid conditions.

Gender	Frequency	Percentage
Female	128	68.4
Male	59	31.6
Mean age±SD	20.05±1.08	

[Table/Fig-1]: Demographic characteristics of the study population.

[Table/Fig-2] shows the distribution of ABO blood groups. Blood group O was the most prevalent (74; 39.6%), followed by B (54; 28.9%), A (46; 24.6%), and AB (13; 7.0%). This indicates a predominance of blood group O in the study population.

ABO Blood group	Frequency	Percentage
A	46	24.6
AB	13	7.0
B	54	28.9
O	74	39.6

[Table/Fig-2]: Blood group distribution.

[Table/Fig-3] illustrates the distribution of personality traits. The most frequently observed trait was openness (101; 54.0%), followed by agreeableness (59; 31.6%). Smaller proportions exhibited neuroticism (18; 9.6%), conscientiousness (7; 3.7%), and

Personality	Frequency	Percentage
Agreeableness	59	31.6
Conscientiousness	7	3.7
Extraversion	2	1.1
Neuroticism	18	9.6
Openness	101	54.0

[Table/Fig-3]: Personality distribution.

extraversion (2; 1.1%). These findings suggest that openness was the dominant personality trait among the participants.

[Table/Fig-4] shows a significant association between gender and personality traits ($p=0.042$), with females predominantly exhibiting openness and agreeableness, while males showed a higher prevalence of openness. A significant association was also observed between ABO blood groups and personality types ($p=0.038$); individuals with blood group B were more frequently associated with openness, whereas those with blood group AB tended to exhibit agreeableness.

Parameters		Personality					
		Agreeableness	Conscientiousness	Extraversion	Neuroticism	Openness	p-value
Gender	Female (n=128)	41 (32%)	6 (4.7%)	2 (1.6%)	17 (13.3%)	62 (48.4%)	0.042
	Male (n=59)	18 (30.5%)	1 (1.7%)	0 (0%)	1 (1.7%)	39 (66.1%)	
ABO -blood group	A (n=46)	12(26.1%)	3 (6.5%)	2 (4.3%)	4 (8.7%)	25 (54.3%)	0.038
	B (n=54)	9 (16.7%)	2 (3.7%)	0 (0%)	5 (9.3%)	38 (70.4%)	
	AB (n=13)	7 (53.8%)	0 (0%)	0 (0%)	2 (15.4%)	4 (30.8%)	
	O (n=74)	31 (41.9%)	2 (2.7%)	0 (0%)	7 (9.5%)	34 (45.9%)	

[Table/Fig-4]: Association of gender and blood groups with personality types.

*p-value <0.05 is significant

DISCUSSION

The present study aimed to explore the association between personality traits and ABO blood group patterns among young medical students, with a particular focus on the Big Five personality dimensions. The findings provide interesting insights into how both gender and blood group types may relate to specific personality tendencies.

Gender-based analysis revealed that both male and female participants predominantly exhibited the openness trait. Openness reflects individual differences in the tendency to seek, understand, and appreciate complex patterns of information, both sensory and abstract. This suggests that irrespective of gender, young medical students tend to be more open to new experiences, ideas, and intellectual challenges. Given the academic demands of medical education, this tendency is understandable, as openness is commonly associated with creativity, intellectual curiosity, and adaptability-qualities essential for medical professionals [16].

The results further indicated that participants with blood groups A, B, and O were predominantly associated with the openness personality trait, while those with blood group AB showed a stronger association with agreeableness.

A statistically significant association between ABO blood groups and personality traits ($p=0.038$) suggests a potential, though weak, correlation. Specifically, individuals with blood groups A, B, and O were more likely to exhibit openness, whereas those with blood group AB tended to demonstrate agreeableness. Agreeableness reflects tendencies toward being cooperative, empathetic, and harmonious in interpersonal relationships. This divergence may indicate unique psychological characteristics associated with the AB blood group, potentially reflecting stronger social and emotional adaptability. However, these interpretations remain speculative and warrant further investigation [16].

The present findings are consistent with some previous studies while differing from others. For example, a study among

Japanese subjects reported a weak but significant association between ABO blood groups and specific personality traits, particularly persistence. Another study observed an association between ABO blood groups and agreeableness but not with other personality dimensions. These results support the notion that blood groups may have a minor yet statistically significant influence on personality traits [6, 16].

Additionally, Lievens F et al., examined personality traits in medical students using the Five-Factor Model and found that conscientiousness and openness were strong predictors of academic success and decision-making. However, no direct association with ABO blood type was reported, suggesting that while personality strongly influences performance, its relationship with blood group remains unclear [17].

Although the present study suggests a possible association-where blood groups A, B, and O are linked with openness and AB with agreeableness-these findings should be interpreted cautiously due to the relatively small sample size, particularly within the AB group. Larger studies are necessary to validate these observations.

Limitation(s)

Several limitations should be considered when interpreting the results. First, although the sample size was adequate for preliminary analysis, it may not be sufficient to generalise the findings to broader populations. Second, personality traits were assessed using a single questionnaire, which may differ in sensitivity and structure from other standardised personality assessment tools. Third, environmental, cultural, and genetic factors that may influence personality development were not controlled for, potentially affecting the results.

CONCLUSION(S)

The present study indicates a modest association between ABO blood groups and certain personality traits, particularly openness and agreeableness. However, inconsistencies across existing literature suggest that blood group alone is unlikely to be a strong determinant of personality. Further research using larger, more diverse populations and comprehensive personality assessment methods is needed to clarify these relationships. Future studies should also explore genetic and environmental influences alongside blood group to develop a more holistic understanding of personality development.

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