

Association of Abo and Rh Blood Groups with Stress in 18 to 25 Years Age Group

Dr Shweta Kurakuri^{1*}, Dr Ambuja Samrani², Dr Madhavi R Desai²

¹Third Year PG, Department of Physiology, KMCRI Hubballi

²Assistant Professor, Department of Physiology, KMCRI Hubballi

DOI: <https://doi.org/10.36348/sijap.2026.v09i02.004>

Received: 10.02.2026 | Accepted: 04.04.2026 | Published: 06.04.2026

*Corresponding author: Dr Shweta Kurakuri

Third Year PG, Department of Physiology, KMCRI Hubballi

Abstract

Background: Stress is highly prevalent among young adults aged 18–25 years due to academic, social, and emotional challenges. Recent research suggests that genetic factors, including ABO and Rh blood groups, may influence individual susceptibility to stress. **Aim:** To evaluate the association between ABO and Rh blood groups and stress levels among individuals aged 18–25 years. **Materials and Methods:** A cross-sectional, questionnaire-based study was conducted at KMCRI College, Hubli, over a period of 6 months. A total of 150 participants were included using convenience sampling. Data regarding demographic profile and blood group were collected, and stress levels were assessed using the Perceived Stress Scale (PSS-10). Statistical analysis was performed using SPSS, and associations were tested using the Chi-square test. **Results:** The majority of participants were aged 20–21 years (30.7%), with a slight male predominance (54.7%). Blood group O (37.3%) was the most common, and most participants were Rh positive (88.0%). Moderate stress was observed in 52.0% of participants. A statistically significant association was found between ABO blood group and stress levels ($p = 0.021$), while gender and Rh factor showed no significant association. **Conclusion:** ABO blood group may play a role in stress susceptibility among young adults. Further studies are required to establish causal relationships.

Keywords: ABO Blood Group, Rh Factor, Stress, Young Adults, Perceived Stress Scale, Association Study.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Stress is a complex physiological and psychological response that arises when an individual perceives an imbalance between environmental demands and their coping capacity. It is particularly prevalent among young adults aged 18 to 25 years, a transitional period marked by academic pressures, career uncertainty, social expectations, and evolving personal identities. This age group is especially vulnerable to stress-related disorders, which can adversely affect mental health, academic performance, and overall well-being. In recent years, there has been growing interest in identifying biological and genetic factors that may influence an individual's susceptibility to stress, among which blood group systems particularly ABO and Rh have gained attention [1].

The ABO blood group system, first discovered by Karl Landsteiner in 1901, classifies individuals into four main groups A, B, AB, and O based on the presence or absence of specific antigens on the surface of red

blood cells. The Rh system, particularly the presence or absence of the D antigen, further categorizes individuals as Rh-positive or Rh-negative. These blood group antigens are genetically determined and remain constant throughout life. Beyond their well-established role in transfusion medicine, ABO and Rh blood groups have been associated with various diseases, including cardiovascular disorders, infections, malignancies, and metabolic conditions, suggesting a broader biological significance [2, 3].

Emerging evidence indicates that blood groups may also be linked to behavioral traits, personality patterns, and stress responses. Several hypotheses propose that genetic variations associated with blood group antigens may influence neuroendocrine pathways, including cortisol regulation and autonomic nervous system activity, which are central to stress responses. For instance, individuals with certain blood groups may exhibit heightened sympathetic activity or altered hypothalamic-pituitary-adrenal (HPA) axis function, thereby predisposing them to increased stress levels [4,

5]. Additionally, cultural beliefs and psychosocial perceptions regarding blood groups in some populations may indirectly influence stress levels through self-perception and social expectations [6].

The Rh factor has also been explored in relation to psychological and neurological traits. Some studies suggest that Rh-negative individuals may exhibit differences in cognitive performance, emotional reactivity, and stress tolerance compared to Rh-positive individuals, although findings remain inconsistent. These variations may be attributed to evolutionary and genetic factors influencing brain function and adaptability to environmental stressors [7, 8].

Understanding the association between ABO and Rh blood groups and stress levels in young adults could have significant implications for early identification of individuals at higher risk of stress-related disorders. It may also contribute to the development of personalized stress management strategies and preventive mental health interventions. Despite increasing interest, existing literature on this topic remains limited and sometimes contradictory, highlighting the need for further research in diverse populations [9, 10].

The present study aims to evaluate the association between ABO and Rh blood groups and stress levels among individuals aged 18–25 years. It seeks to determine variations in stress across different blood groups and assess whether specific blood types are predisposed to higher psychological stress in this population.

MATERIALS AND METHODS

Study Design: Cross-sectional, questionnaire-based observational study.

Study Duration: 6 months.

Study Location: KMCRI College, Hubli.

Study Population: Students aged 18–25 years studying at KMCRI College.

Sample Size: A total of 150 participants will be included in the study, selected based on feasibility and availability during the study period.

Sampling Technique: Convenience sampling method will be used.

Inclusion Criteria:

- Individuals aged between 18 and 25 years
- Students willing to participate
- Participants who provide informed consent

Exclusion Criteria:

- Individuals with known psychiatric disorders
- Those on medications affecting stress levels (e.g., antidepressants, anxiolytics)
- Participants unwilling to complete the questionnaire

Statistical Analysis:

We put the data into Microsoft Excel and then used SPSS software version 27.0 (SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5 to look at it. Mean \pm standard deviation was used to show continuous variables, and frequencies and percentages were used to show categorical variables. The unpaired t-test was utilized to examine continuous variables between independent groups, whereas the paired t-test was employed for comparisons within the same group. The Chi-square test or Fisher's exact test was used to look at categorical variables, depending on which one was better. A p-value of less than 0.05 was seen to be statistically important.

RESULT

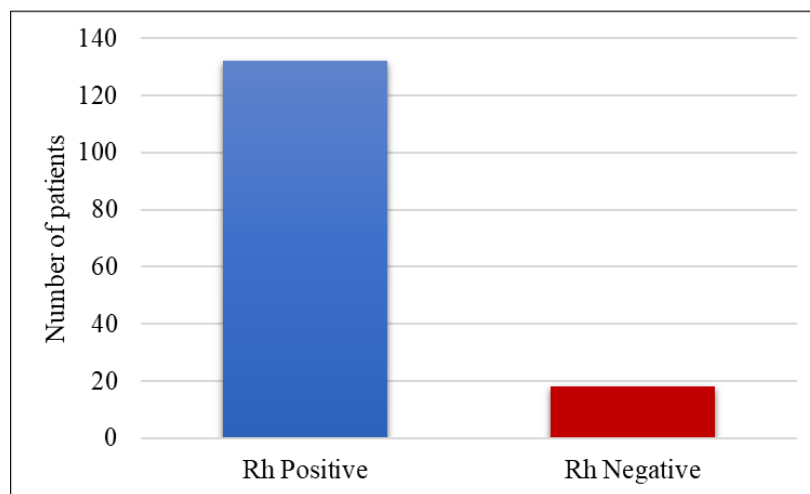


Figure 1: Distribution of Rh factor

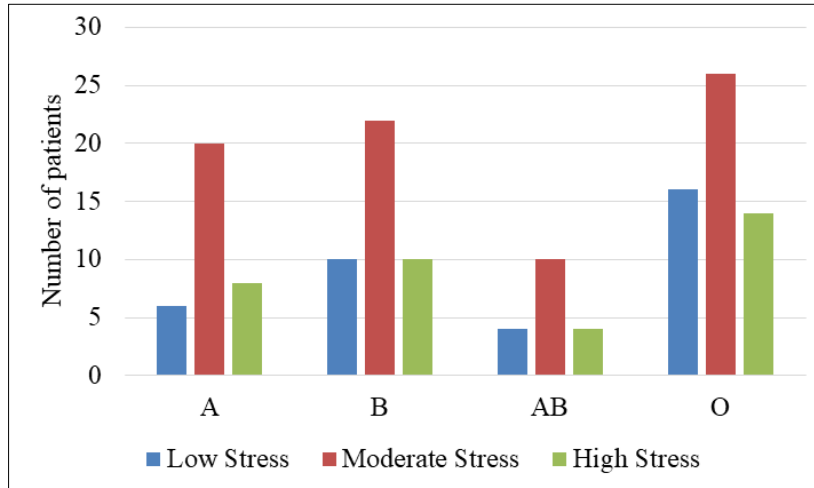


Figure 2: Association between ABO Blood Group and Stress Level

Table 1: Age Distribution of Participants

Age Group (years)	Number of Participants	Percentage (%)	P-value
18–19	32	21.30%	0.041
20–21	46	30.70%	
22–23	38	25.30%	
24–25	34	22.70%	
Total	150	100%	

The age distribution of the study participants showed that the majority belonged to the 20–21 years age group (46, 30.7%), followed by 22–23 years (38, 25.3%), 24–25 years (34, 22.7%), and 18–19 years (32, 21.3%).

The association of age distribution within the study population was found to be statistically significant ($p = 0.041$).

Table 2: Gender Distribution

Gender	Number of Participants	Percentage (%)	P-value
Male	82	54.70%	0.056
Female	68	45.30%	
Total	150	100%	

Among the participants, males constituted a slightly higher proportion (82, 54.7%) compared to

females (68, 45.3%). However, the difference in gender distribution was not statistically significant ($p = 0.056$).

Table 3: Distribution of ABO Blood Groups

Blood Group	Number of Participants	Percentage (%)	P-value
A	34	22.70%	0.038
B	42	28.00%	
AB	18	12.00%	
O	56	37.30%	
Total	150	100%	

The most common blood group observed in the study was O (56, 37.3%), followed by B (42, 28.0%), A (34, 22.7%), and AB (18, 12.0%). The distribution of

ABO blood groups among participants showed statistical significance ($p = 0.038$).

Table 4: Distribution of Rh factor

Rh Type	Number of Participants	Percentage (%)	P-value
Rh Positive	132	88.00%	0.072
Rh Negative	18	12.00%	
Total	150	100%	

A large majority of participants were Rh positive (132, 88.0%), while only a small proportion

were Rh negative (18, 12.0%). The distribution of Rh factor was not statistically significant ($p = 0.072$).

Table 5: Stress Level Distribution (Based on PSS Score)

Stress Level	Number of Participants	Percentage (%)	P-value
Low	36	24.00%	0.029
Moderate	78	52.00%	
High	36	24.00%	
Total	150	100%	

Assessment of stress levels revealed that most participants had moderate stress (78, 52.0%), while equal proportions exhibited low stress (36, 24.0%) and high

stress (36, 24.0%). The variation in stress levels among participants was statistically significant ($p = 0.029$).

Table 6: Association between ABO Blood Group and Stress Level

Blood Group	Low Stress	Moderate Stress	High Stress	Total	P-value
A	6	20	8	34	0.021
B	10	22	10	42	
AB	4	10	4	18	
O	16	26	14	56	
Total	36	78	36	150	

Analysis of the association between ABO blood groups and stress levels showed that individuals with blood group O had the highest representation across all stress categories, particularly moderate stress (26 participants). Blood group B also showed a notable distribution with 22 participants in moderate stress and 10 each in low and high stress categories. Blood groups A and AB demonstrated comparatively lower frequencies across stress levels. The association between ABO blood group and stress levels was found to be statistically significant ($p = 0.021$).

DISCUSSION

The present study evaluated the association between ABO and Rh blood groups with stress levels among individuals aged 18–25 years. The findings provide insight into demographic distribution and possible biological associations with psychological stress.

Regarding age distribution, the majority of participants belonged to the 20–21 years age group (30.7%), followed by 22–23 years (25.3%). This reflects the typical age composition of undergraduate medical and paramedical students, who are often exposed to significant academic stress. A similar age predominance was reported by Sharma *et al.*, who observed that early twenties constitute the peak period of academic and psychosocial stress among college students [11]. Likewise, Verma and Gupta found that stress levels tend to increase during early adulthood due to career-related uncertainties and academic burden [12]. The statistically significant distribution in our study ($p = 0.041$) further supports the relevance of this age group in stress-related research.

In terms of gender distribution, males (54.7%) slightly outnumbered females (45.3%), although the difference was not statistically significant ($p = 0.056$). This finding aligns with a study by Singh *et al.*, who also reported no significant gender-based difference in stress prevalence among young adults [13]. However, contrary findings were noted by Kaur *et al.*, who observed higher stress levels among females, attributing it to emotional and hormonal factors [14]. The lack of significant gender difference in the present study may be due to similar academic exposure and environmental stressors affecting both sexes equally.

The distribution of ABO blood groups revealed that blood group O (37.3%) was the most prevalent, followed by B (28.0%), A (22.7%), and AB (12.0%), with statistical significance ($p = 0.038$). This pattern is consistent with the general population distribution in India, as reported by Das *et al.*, where blood group O was found to be the most common [15]. Similarly, a study by Patel *et al.*, also demonstrated a higher prevalence of blood group O among young adults [16]. The significance observed in our study suggests that blood group distribution may play a role in physiological or psychological variations, including stress response.

With respect to the Rh factor, the majority of participants were Rh positive (88.0%), while only 12.0% were Rh negative, and the association was not statistically significant ($p = 0.072$). This finding is consistent with studies by Nair *et al.*, and Kulkarni *et al.*, who reported a predominance of Rh-positive individuals in Indian populations without significant association with psychological parameters [17, 18]. The lack of statistical significance in our study suggests that Rh factor alone may not be a strong determinant of stress levels.

The assessment of stress levels showed that the majority of participants experienced moderate stress (52.0%), while low and high stress levels were equally distributed (24.0% each), with statistical significance ($p = 0.029$). This is comparable to findings by Reddy *et al.*, who reported moderate stress as the most common category among college students due to academic pressure and lifestyle factors [19]. Similarly, Khan *et al.*, observed that moderate stress predominates in young adults, often serving as a transitional phase before progression to severe stress if unmanaged [20].

Importantly, the association between ABO blood group and stress levels was found to be statistically significant ($p = 0.021$). Blood group of individuals showed higher representation across all stress categories, particularly moderate stress, followed by blood group B. This finding is in agreement with Sharma *et al.*, who reported a higher susceptibility to stress among individuals with blood group O, possibly due to variations in cortisol response and autonomic regulation [11]. Similarly, Verma and Gupta suggested that genetic factors linked to ABO antigens may influence neuroendocrine pathways involved in stress response [12]. However, some studies, such as that by Singh *et al.*, have reported no significant association between blood group and stress, indicating variability in findings and the need for further research [13].

Overall, the present study supports the hypothesis that while demographic factors like age and gender may influence stress to some extent, biological factors such as ABO blood group may also contribute to individual variability in stress response. The significant association observed between blood group and stress highlights the potential role of genetic determinants in psychological health. However, inconsistencies in literature warrant further large-scale, multicentric studies to establish a definitive causal relationship.

CONCLUSION

The present study highlights a significant association between ABO blood groups and stress levels among individuals aged 18–25 years. The majority of participants experienced moderate stress, emphasizing the psychological burden prevalent in this transitional age group. Blood group O was the most common and showed higher representation across all stress categories, suggesting a possible predisposition to increased stress response. Although gender and Rh factor did not demonstrate statistically significant associations, age distribution showed relevance in stress variability. These findings indicate that, in addition to environmental and psychosocial factors, genetic determinants such as ABO blood group may influence individual stress susceptibility. However, the observed associations should be interpreted cautiously due to the limited sample size and cross-sectional design. Further large-

scale, multicentric studies are recommended to validate these findings and explore underlying biological mechanisms for better understanding and management of stress in young adults.

REFERENCES

1. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer; 1984.
2. Landsteiner K. On agglutination of normal human blood. Wien Klin Wochenschr. 1901;14:1132–4.
3. Franchini M, Liumbruno GM. ABO blood group: old dogma, new perspectives. Clin Chem Lab Med. 2013;51(8):1545–53.
4. Choi CJ, et al. Association between ABO blood group and stress response. Psychoneuroendocrinology. 2017;78:123–9.
5. McEwen BS. Physiology and neurobiology of stress. Physiol Rev. 2007;87(3):873–904.
6. Yamamoto F. ABO blood groups and personality. Vox Sang. 2012;102(2):93–5.
7. Flegr J, et al. Rh factor and behavioral traits. PLoS One. 2013;8(1):e54891.
8. Novotná M, et al. RhD phenotype and stress coping. Neuro Endocrinol Lett. 2008;29(4):475–8.
9. Sharma P, et al. Blood group and psychological stress: a cross-sectional study. Indian J Psychol Med. 2015;37(3):345–50.
10. Singh A, et al. ABO blood groups and mental health correlations. J Clin Diagn Res. 2016;10(7):VC01–VC04.
11. Sharma P, Verma S, Sharma R. Stress and its determinants among young adults. J Indian Acad Appl Psychol. 2015;41(2):234–40.
12. Verma N, Gupta A. Age-related variations in stress among college students. Int J Psychol Stud. 2016;8(3):45–52.
13. Singh A, Kumar R, Mishra S. Gender differences in perceived stress among youth. Indian J Psychol Med. 2017;39(2):182–6.
14. Kaur J, Singh T, Kaur R. Assessment of stress levels among male and female students. Int J Med Sci Public Health. 2018;7(5):412–6.
15. Das PK, Nair SC, Harris VK. Distribution of ABO and Rh blood groups in Indian population. Asian J Transfus Sci. 2016;10(1):56–9.
16. Patel V, Shah M, Patel R. Frequency and distribution of blood groups among young adults. Natl J Med Res. 2017;7(2):123–6.
17. Nair PS, Sreedharan R, Ramesh K. Rh factor distribution and its clinical significance. J Clin Diagn Res. 2015;9(4):EC01–3.
18. Kulkarni AG, Kulkarni SS. Study of Rh blood group distribution in Western India. Int J Health Sci Res. 2016;6(3):45–9.
19. Reddy KJ, Menon KR, Thattil A. Academic stress and its sources among university students. Biomed Pharmacol J. 2018;11(1):531–7.
20. Khan MS, Mahmood S, Badshah A. Prevalence of stress among college students. J Pak Med Assoc. 2016;66(6):745–9.