

Association between ABO Blood Group Phenotype and Reaction to Academic Stress in Young Medical Students

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ABSTRACT

Introduction: Professional medical education needs hard work, good physical and mental health. In previous studies there is no scientific consensus that a relationship exists between the ABO blood group and personality traits. In this current study we tried to find out association between different blood groups and different type of stressors like physical, environmental, interpersonal and academic in young medical students.

Material and methods: This Descriptive Cross sectional study was conducted at Rashid Latif Medical College Lahore from April to May 2019. A modified pre structured, valid and reliable questionnaire SSI was used to access the physical, academic, environmental, interpersonal stress, blood group and gender of 1st year and 2nd year MBBs students. Initially 220 (91 male and 129 female) were enrolled.

Results: A total of 216 medical students filled in the survey out of 220 students, 126 students (n=126) were female and (n=90) were male who completed the questionnaire; the response rate was 98.18%. Out of 216 students blood group A was 32, AB was 42, B was 92 and O was 50. A greater variation in the response was observed in the physical category (St: deviation 10.40), while the least variation was observed in the category of interpersonal (St: deviation 5.27), respondents while the variation tends to increase in environment (St: deviation 6.78) and academic (St: deviation 7.20).

Conclusion: All variables stressors like Physical, academic, environment and interpersonal are found to have negative and insignificant relationship with dependent variable blood group.

Keywords: Blood Group, ABO, Medical Students, SSI, Stress

INTRODUCTION

In early years of medical education, life is exceptionally competitive and demanding, resulting in feelings of distress and worry in many who are unable to cope with the pressures in their immediate environment.^{1,2} Majority of the teenager medical students face a variety of stressors associated with their education; if not immediately identified and adequately managed³, it may bring about several negative consequences in terms of psychological wellness and academic performance.⁴ Forces from the outside world impose on the young one could be counted as 'Stress'.⁵ Stress can be defined as "a state of mental or emotional strain or suspense" and conjointly as "a verity of normal reactions of the body (mental, emotional, and physiological) designed for self-preservation".⁶

Psychologically inability of stress response system leads to several diseases including metabolic disorders, gastric disorders, obesity, sleep disorders, respiratory disorder, cardio vascular disease, osteoporosis, reduced mental alertness, increased anxiety, risk of depression, poor academic results and several cancers.⁵⁻⁹ However many studies data of evidence indicates that individuals of different phenotype blood groups have very different responses to the same stressor.^{10,11}

Blood group type has been connected with a spread of mental stress, anxiety or illness, however limited literature is available and the associations of blood group and stress are weak—many alternative factors are untouched and WHO finally ends up with associate degree malady. Still, the very fact that shows affiliation might exist intrigues some scientists, hope someday to uncover the biological processes that link blood molecules to mental state, presumably up our understanding and treatment of those sicknesses. Stressor people with "O" blood group could also be additional seemingly to possess depression and intense anxiety; kids may be at a larger risk of attention-deficit disorder. "A" blood group individual could also vulnerable to neurotic disorder, sleep disorder and hysteria. People with "B" blood group could have a lower risk of attention-deficit disorder. "AB" blood group are face loneliness, isolation and emotional stress.¹²⁻¹⁵

This study was carried out with the objectives to determine the prevalence of self-perceived stress among under graduate medical students and to observe an association between the levels of stress and blood group.

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MATERIAL AND METHODS

This cross-sectional study was conducted between the month of April and May, 2019 in a Rashid Latif Medical College. Students were invited to participate in the survey through several media including announcement during lecture, tutorial and practical classes. Participation was free and voluntary. Verbal consent from students was taken. Privacy and confidentiality was ensured. Initially 220 students who responded to the invitation, 220 (91 male and 129 female) undergraduates from 1st and 2nd year MBBS to meet the inclusion criteria, 4 students were rejected because of inappropriate age (<18years), missing data, decline participation, and inadequate completion of questionnaire incomplete data and were assessed.

Two survey instruments were used in this study, in first for gender and blood group only. Second is the questionnaire consisted of items adapted from Perceived student stress inventory (SSI)¹⁶ reliability coefficient is 0.857 and measures perceived stress, reaction to stress. Briefly, participants were asked to respond to each question on a five point scale ranging

from 0 (never), to 4 (always). Total score interpretation ranging mild stress score 40-80, moderate stress score 81-121 and sever stress score 122-160 (table-1).

Reaction sub-scale consisted of 40 items and measures four categories of reactions to stressors (physical, 10 items, Interpersonal Relationship, 10 items, Academic, 10 item, Environmental, 10 items).

Blood samples were obtained from all participants through a finger prick with a sterile disposable lancet. Anti-A, anti-B and anti-D monoclonal blood group reagents were used to determine participants' ABO blood group phenotype by slide agglutination method.¹⁷

RESULTS

Out of 216 students (n=126) were female and (n=90) were male in which blood group A was 32 (n=216), AB was 42 (n=216), B was 92 (n=216) and O was 50 (n=216). Table 2 shows the distribution of blood group.

Standard deviation provides the distance between different values. In table 3 values suggest that a greater variation in the response was observed in the physical category, while the least variation was observed in the category of interpersonal. This provides that from the perspective of interpersonal there are comparatively less difference in the opinion of the respondents while the variation tends to increase in environment, academic and is greatest in Physical (table-3). In the table 4 model summary indicates the relationship between estimated value of dependent variable and studied variables. All mentioned independent variables shows the R value is in this study 65%. R value also indicates overall fitness of model.

There is no separate definition of ANOVA but it indicates fitness of model, however in the table-5, the sig value of .926 which is greater than 0.05 thus it suggests that the model does not provide a significant relation between the variables.

Total score	Level of Stress
40-80	Mild Stress
81-121	Moderate Stress
122-160	Severe Stress

Table-1: Recommended cutoff scores of student score inventory:

List of variable	Number	Standard Deviation
Physical	216	10.40988
Academic	216	7.20844
Environment	216	6.79861
Interpersonal	216	5.27235

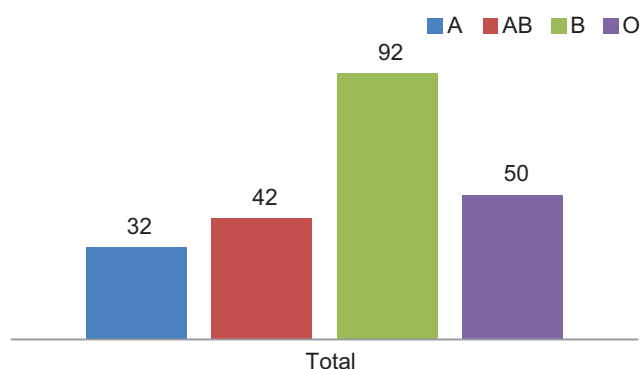
Table-2: Distribution of blood group

Model	R
1	.065 ^a

Table-3: Model summary Predictors: (Constant), interpersonal, Physical, environment, academic

Model		Sig.
1	Regression	.926 ^b
	Residual	
	Total	

Table-4: Dependent Variable: Blood Group and Predictors: (Constant), interpersonal, Physical, environment, academic



Graph-1: Blood Group Distribution

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.565	.437		5.868	.000
	Physical	-.004	.007	-.041	-.588	.557
	academic	-.003	.014	-.025	-.241	.810
	environment	.009	.012	.058	.739	.461
	interpersonal	-.002	.020	-.010	-.095	.924

Table-5: Coefficientsa Dependent Variable: Blood Group

This Sig value concludes our studied research model is not fit and we cannot predict the results of dependent variables with respect to independent variables

A coefficient table 6 shows two important values, value of beta and p-value. The value of beta usually determines the relationship between dependent variable with independent variables whereas p-value shows level of significance. The p values or the value of the sig suggest that no variable has a significant relationship in the model or with the dependent variable. If the significance value of any one was less than 0.05, we could have assumed that a significant relationship exists, however this is not the case. We can see in this study all studied variables Physical, academic, environment and interpersonal are found to have negative and insignificant relationship with dependent variable blood group

DISCUSSION

ABO blood groups in 216 students and most common blood group was “B” (92), followed by “O” (50), “AB” (42), “A” (32) Higher incidence of blood group B is seen in this study, Sharifi et al.,¹⁸ study also shows blood group B is very common. Garg et al.,¹⁹ found the same incidence rate. Only one study studies shows most common blood group was “O”²⁰, Otherwise many other studies shows common blood group was “B”.^{21,22,23}

This study analyzed the relationship between the four basic blood types (A, B, O, AB) and medical education stress levels. It sought to determine whether there was any relationship between blood type, gender, and the dependent variables of stress like, physical, interpersonal relationship, academics and environment. Female and male response ratio is 7:5 which shows higher responders are female than males. Young medical student’s academic performance can cause stress symptoms such as anxiety, insomnia or changes in appetite and breathing pattern.² Physical stress has score highest among students in our study. The fear of exams and workload create stress among students.¹⁸ In this study the main cause of stress among university students is a physical stress and most of the time it is due to lots of assignments, study burden. Friends and parents’ expectations, change in teaching and learning methodology also cause stress.

In the present study, the students had mild to moderate degree of stress in different stress domains. Even though there was a positive association between blood groups and stress domains, it was irrelevant or insignificant relationship with variable quantity blood type.²⁴

Individuals of different blood types have different ways to respond to stress management. The surface of membrane of RBC’s contains a variety of genetic material (antigen).^{17,13} The blood group A, AB and B contain H antigen. The N-acetylgalactosamine (sugar) is present on H antigen on blood group A, while in B group it is galactose and AB group having both terminal sugars. On the other hand blood group O has no surface antigen.²⁵ Nitric oxide (NO) is factor in blood group B persons that may cause to develop mental illness, amnesia, hypertension, etc. it is hypothesis that blood group B as well as AB secrete more. NO is also

act as neurotransmitter in immune, CVS, reproductive and nervous system and it is supportive for recovery from stress situations is much faster than the B and O blood group.²⁵ Blood group A mostly represent with high levels of cortisol and the cortisol is a stress hormone, so the person is more prone to develop hypertension, hyper cholesterol, Alzheimer etc so they are more predisposed to develop obsessional neurosis, depression and stress in personality.²⁶

In our study medical students with “O” blood group seem depressed and attention-deficit disorder. Blood group “A” individual could also susceptible to develop neurotic disorder, insomnia and emotional in stress. “B” blood group could have a lower risk of attention-deficit disorder. A person belongs to “AB” Blood type adjusts well in all situations¹⁵, “AB” blood group could face isolation, anxiety and loneliness in stress.²⁷ However, there is no scientific consensus in these facts. In another study the author was demonstrated that no huge contrast exist among various blood classifications in regards to their character qualities.²⁴ In the findings another study, people with blood type A had the most emotional sensitivity and stable emotions.¹⁸

The present study is in conjunction with the study by Yogeeshwaran *et al.*²⁸ That also has shown no association of blood groups with stress among medical students. Another study conducted by Rogers *et al.*,²⁹ and they found no significant relationship was found between blood type and stress for this sample. Another study done by Gumessm C., in 1998 was based on the blood type (O) and its association with anxiety and a statistically significant and there was a type of genetic disorders linked to an bilaterally and it was linked to a series for the type of blood type (O).¹³

CONCLUSION

The results of present support the previous research studies and it can be concluded that there is no association between ABO blood group phenotype and reaction to academic stress in young medical students.

Recommendation

In light of the findings of the research, the researcher recommends to find out association between ABO blood group genotype and stress on personality traits in a large number of healthy subjects and also discuss ways to the advancement of the psychological education and mental health in the country.

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