Original Article

Prevalence of ABO Blood Groups and their Association with Dust, Pollen and Skin Allergy in Young Adults

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ABSTRACT

Objectives: To find prevalence of ABO blood groups and to investigate their association with dust, pollen and skin allergy.

Materials and Methods: This cross sectional study was done at Islamabad Medical & Dental College Bhara Khou Islamabad Pakistan from April 2011 to May 2012. *n*= 123, both male and female First year M.B; B.S students 18-21 years of age were enrolled for the study during Hematology module. ABO blood group of study population was done by antisera method. A detailed history of study population regarding dust, pollen and skin allergies was recorded on a preformed Performa.

Result: In our study population B blood group came out to be the most common (34%). History of allergy was reported by 65 % of our study population. Dust allergy and pollen allergies were found high among individuals with B blood group being 43% and 43.75% respectively. Skin allergy was reported high among A blood group individuals (40%). Blood group AB was found to be at lowest risk level for allergies. The study showed association between blood groups and allergies as < 0.0007 statistically significant p-value.

Conclusion: In the study population blood group B being the most common is at high risk level for developing allergies. Blood groups A and O were found to have nearly same level of allergies while Blood group AB being the most protected one. This statistically significant association of various blood groups with allergy development could help in identifying people at risk as an aid to preventive measures.

Key words: Blood groups, risk, allergy, dust, pollen, association.

Introduction

In human beings, 19 blood groups systems with more than 200 antigens have been identified. In clinical practice common blood groups are ABO and Rh. The gene for ABO group is present on chromosome 9 while for Rh system it is on chromosome1. The Rh system is one of the most polymorphic of the human blood groups. More than 40 different antigens have been identified; five are common known as D, C, c, E and e.

Literature review strongly support that individual lacking the A and/or B antigen on the red cells, always have naturally-occurring antibodies to the missing antigen(s) in their plasma. It has been reported that at four to six month of age they appear in blood usually after exposure to bacterial antigens. These bacterial antigens gain entry into body and colonize the gut in early infancy.[1]

The study of blood grouping is very important as it plays an important role in genetics, blood transfusion, and

forensic pathology and may have some association with diseases like duodenal ulcer[2], diabetes mellitus[3], urinary tract infection[4], Rh incompatibility and ABO incompatibility of newborn. As blood group determination is important in clinical practice it was felt to know the prevalence of different blood groups.

Most of the studies [5, 6] in Pakistan gave the general pattern of prevalence of B blood group while other studies [7, 8] showed O to be the most prevalent blood group. But none of the studies showed A to be the most common. International studies [9, 10] showed the same pattern with some of the studies [11, 12] showing O to be the most prevalent, followed by A and only one study[13] showed equal prevalence of O and A.

There has been extensive scientific research over the past 30 years that shows evidence that your individual blood type determines your predisposition toward getting certain diseases, such as cancer, heart disease, diabetes, lupus, muscular sclerosis, allergies, etc. Allergic diseases are fairly common in all parts of the world and involve all ethnic groups with bronchial asthma, allergic rhinitis, conjunctivitis and eczema being the commonest manifestations.

Atopy, also called atopic allergy is a disorder in which there is hereditary tendency that lead to development of acute allergic reactions on exposure to certain substances like pollen, food, dander, and insect venoms. Atopic dermatitis (AD) a variant of atopic allergy is an abnormal skin reaction seen in individuals with high serum levels of IgE and a personal or family history of AD, allergic rhinitis and/or asthma. There is not much confirmation regarding the exact cause of AD but it seems to be multi factorial resulting due to genetic and environmental factors interplay.[14] Multiple studies have reported an alarming increase within the last three decades in the prevalence of AD.[15] Environment plays a major role in the etiology and pathogenesis of AD that ultimately lead to variability reported in its presentation at different places.[16, 17]

Another major source of allergens is house dust mite and it is mostly reported in temperate humid areas in the world. In response to house dust mite allergen sensitization an individual develops perennial rhinitis, asthma, or atopic dermatitis. Literature survey strongly supports that measures against mite allergen can effectively reduce allergic symptoms. This can be achieved by displacing patients to a mite allergen-free environment. It is very essential to provide knowledge to the common public about house dust mite and how to safeguard against it. As far as environmental factors causing allergies are concerned it has been found that pollens are at the highest ranking as far as aeroallergens are concerned.[18]

There appear to be no authentic data on the prevalence of allergic diseases in different blood groups in Pakistan; therefore the need was felt to carry out this study. This segment of ABO blood groups and allergies is only occasionally cited in the literature.[19, 20]

Materials and Methods

This cross-sectional study was carried out at Islamabad Medical & Dental College Bhara Khou Islamabad from April 2011 to May 2012. It included n= 123 young adults of 18-21 years of age both males and females. Informed consent was taken from the participants of the study. ABO blood group was determined by conventional glass slide antisera method. Blood samples were collected by finger prick with a sterile lancet, after cleaning the puncture site with 70% ethyl alcohol. A drop of anti-sera, A and B was placed on glass slides. A drop of blood from each subject was mixed with each anti-serum individually with the help of separate glass rods. Blood groups were determined on the basis of agglutination.

In order to investigate any possible association of blood groups with allergy a Performa was developed. The Performa comprised of a questionnaire regarding history of dust, pollen and skin allergy in our study population. Later on the significance level was drawn.

Results

The distribution of ABO blood groups as illustrated in Table I, showed that blood group B was predominant group in our study population.

Table 1: Prevalence of Blood groups among study population.

A blood group	*B Blood group*	*AB Blood group*	*O Blood group*
n=28 (22%) males=9 females=19	**n**=50 (34%) males=28 females=22	**n**=17 (11%) males= 7 females=10	**n**=28 (22%) males=13 females=15

Gender based prevalence as shown in(figure 1) depicts that Blood group B is the most common blood group in both the genders. However, blood group A, AB and O were more common among females of study population.

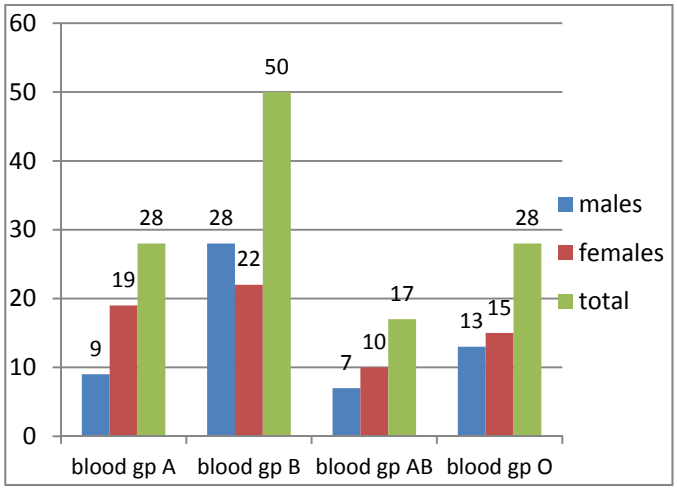

Figure 1. Gender based prevalence of blood groups

The incidence of dust, pollen and skin allergy in different blood groups as shown in (figure 2) depicts highest level of allergies in both males and females with B blood group. Blood group AB showed least level of allergies but none of any blood group is protected from developing allergies.

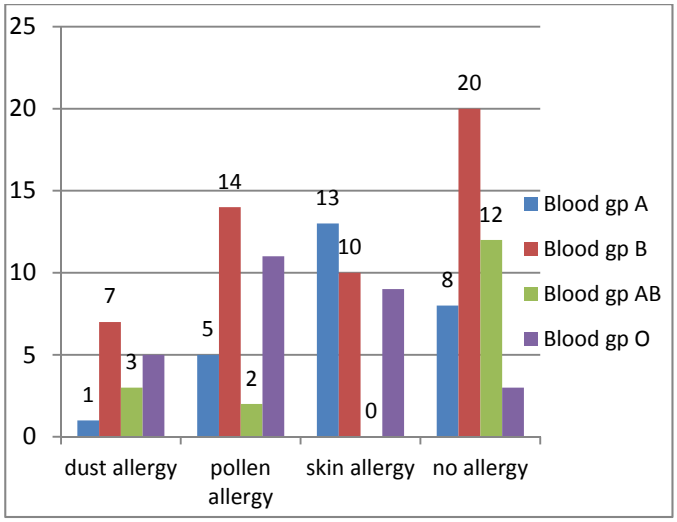

Figure 2. Allergic and non allergic cases in different blood groups

A comprehensive numerical illustration for blood groups and different allergy types is shown in table 2.

Data was entered and analyzed by using SPSS software. Mean and standard deviation was calculated for Quantitative data and frequencies with percentages are presented as qualitative data. Chi-square test was applied to find out association between qualitative variables. The p-value 0.0007 showed strong association between blood groups and allergies in our study population.

Table 2: Association of Blood Groups with Allergy Types.

Blood Groups	Allergy				Total	p-value
	Dust Allergy	Pollen Allergy	Skin Allergy	No Allergy		
Blood group A	1	5	13	8	27	
Blood group B	7	14	10	20	51	
Blood group AB	3	2	0	12	17	***0.0007***
Blood group O	5	11	9	3	28	
Total	16	32	32	43	123	

Discussion

In our study, the commonest ABO blood group was B followed by AB, O and A. Regarding association between ABO blood group and allergies the significant p value of 0.0007774 shows that there is a strong correlation between these two variables. The studies[21, 22, 23, 24] resemble our results for ABO blood groups showing B to be the most prevalent blood group in Pakistan. While other studies[25, 26] in Pakistan showed different results as O blood group prevalence. . But none of these studies showed A to be the most common. International studies.[27] showed the same pattern. Results of Shaik YA et al[28] showed the predominance of blood group O in contrast to our study. There is no doubt that some sort of association was investigated between ABO blood groups with duodenal ulcers, diabetes and urinary infections but association of ABO blood groups with dust, pollen and skin allergy had never been investigated extensively. One or the study done in India by Mahdi Bijanzadeh et al[29] in 2009 found no association between ABO blood groups and asthma. Our study has tried to find out the association on the basis of history of allergy in different blood groups. In 2011 Nelson Falsarella et al[30] came up with the results showing the association of O blood groups with allergic rhinitis. Our study results showed clinical significance as well as statistically significant p value.

Conclusion

The prevalence of blood groups in our study population has concluded that certain blood groups have more tendencies to develop allergies while some are protected. The strong association between ABO blood groups and allergies could be utilized in identifying people who are at risk for developing these allergies in

order to exercise timely preventive measures. As future implication there is need to investigate the association of ABO blood groups and allergies at molecular level.

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