ORIGINAL ARTICLE

Frequency of Abo and Rh Blood Groups in Patients with Diabetes Mellitus

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ABSTRACT

Background: Diabetes mellitus (DM) is a metabolic disorder with features involving almost all systems of the body. It is known for its dysglycemia and the related sequela, leading to macro and micro vascular complications. It is thought that blood group determines the chances of getting the disease. ABO classification is the most known entity of groups know. A and B genes determine which blood group a human will have. There is evidence that people of specific blood group have more incidence of diabetes.
Aim: To determine the frequency of ABO and Rh blood groups in patients with diabetes mellitus in the local population.
Place and Duration of Study: Department of Medicine, Shaikh Zayed Hospital, Lahore from six months from: 20-11-2015 to 20-05-2016.
Methodology: This was a cross sectional study. Data of 250 diabetic patients admitted in medicine department and visiting OPD's, Shaikh Zayed Hospital were collected after informed consent. Blood samples 3ml were drawn and sent to Blood Bank for ABO Rh grouping by applying anti-A, anti-B and anti-D blood grouping reagents
Results: In our study, out of 250 cases, 45(18%) were between 15-40 years of age while 205(82%) were between 41-70 years of age, Mean±SD was calculated as 54.11±9.81 years, 130(52%) were male and 120(48%) were females, frequency of ABO and Rh blood groups in patients with diabetes mellitus in the local population group was recorded as 52(20.8%) in A+, 55(22%) had B+, 23(9.2%) had AB+, 97(38.8%) had O+, 2(0.8%) had A-, 8(3.2%) had B, 3(1.2%) had AB- and 10(4%) had O-.
Conclusion: We concluded that the frequency of ABO is significantly higher as compared to Rh blood groups in patients with diabetes mellitus in the local population
Keywords: Diabetes Mellitus, ABO, Rh Blood Groups, Frequency.

INTRODUCTION

Karl Landsteiner was the first person who talked about ABO blood grouping[1]. There blood cells (RBC) antigen determines what blood group the human will have. Also its either gene A or gene B on the chromosome 9, the presence or absence of which determines the blood group of a person[2,3] and on chromosome 1 for Rhesus system. On the basis of Rh antigens of chromosome 1, blood group is classified into Rh positive or negative[3].

The ABO system contains polymers of carbohydrate. The enzyme Glycosyl transferase that transform H antigen into A and B is deficient in the people with blood group O so they continue to express H antigen[4]. Since the discovery of ABO and Rh group systems, the association of disease and these groups has been discussed many a times[5]. A lot many studies has been published in the near past pointing out a clear cut relation between blood groups and occurrence of diabetes that itself is a complex syndrome having multiple etiological factors i.e. genetic, immunological and environmental[6,7].

To reach to definite cause or any positive or negative association of specific ABO /Rh group with diabetes[5]. McConnell's showed an increased prevalence group A in diabetics[8] while group O was more frequent blood group In Copenhagen stud[9]. Another study demonstrated a significant difference between healthy subjects and diabetic patients in B and Rh-positive blood groups.[10] Blood group O had same distribution among both groups. Rh negative blood group is more frequent in diabetic group (12.44% vs. 7.73%)[11].

As scanty data exists about association of diabetes with blood groups, we conducted this study to see pattern of ABO prevalence in diabetic population.

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SUBJECTS AND METHODS

This cross sectional study Department of Medicine, Shaikh Zayed Hospital, Lahore from 20-11-2015 to 20-05-2016. The sample size of 250 cases is calculated with 95% Confidence level, 3.5% margin of error and taking expected percentage of blood group AB 8.5% in patients with diabetes mellitis.

Inclusion Criteria

- All diabetic patients on medicine for at least 1year, presenting for follow up
- Patients of both gender
- Patients of ages between 15-70 years

Exclusion Criteria

- Secondary diabetes–Fasting blood sugar >126mg/dL in patients with other endocrine diseases and corticosteroid intake assessed on history and clinical examination.
- Gestational diabetes–Fasting blood sugar >126mg/dL found first time during pregnancy.

Data collection procedure: Data of 250 diabetic patients admitted in medicine department and visiting OPD's, Shaikh Zayed Hospital, were collected by filling proforma in those who sign the informed consent forms. 3ml venous blood sample was obtained from each participant. The samples were sent to blood bank for blood group tested. Anti-A, anti-B and anti-D, blood grouping reagents was used to determine the ABO and Rh (D).

Data analysis procedure: The data was entered and analysed by using SPSS 22.0. Qualitative data like gender and Rh blood group type (i.e. A, B, AB, O and Rh) was presented by using frequency and percentages. Quantitative data like age was presented by Mean±S.D. Data was stratified for gender and family history of diabetes. Post stratification chi-square test was used. A value of $P < 0.05$ was considered significant.

RESULTS

A total of 250 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of ABO and Rh blood groups in patients with diabetes mellitus in the local population. Age distribution of the patients was done, it shows that 45(18%) were between 15-40 years of age while 205(82%) were between 41-70 years of age, mean±SD was calculated as 54.11**±**9.81 years (Table 1).

Table 1: Age Distribution (n=250)

Age(in years)	n	%age
15-40	45	18
41-70	205	82
Total	250	100
Mean±SD	54.11±9.81	

Table 2: Gender Distribution

Gender	n	%
Male	130	52
Female	120	48
Total	**250**	**100**

Table 3: Frequency of ABO and Rh blood groups in patients with diabetes mellitus in the local population

Rh blood group type	n	%age
A+	52	20.8
B+	55	22
AB+	23	9.2
O+	97	38.8
A-	2	0.8
B-	8	3.2
AB-	3	1.2
O-	10	4
Total	250	100

Table 4**:** Stratification for gender

Rh blood group type	Male (n=130)	Female (n=120)
A+	24	28
B+	29	26
AB+	13	10
O+	51	46
A-	2	0
B-	5	3
AB-	2	1
O-	4	6

P value 0.64

130(52%) were male and 120(48%) were females (Table 2). Frequency of ABO and Rh blood groups in patients with diabetes mellitus in the local population group was recorded as 52(20.8%) in A+, 55(22%) had B+, 23(9.2%) had AB+, 97(38.8%) had O+, 2(0.8%) had A-8(3.2%) had B-, 3(1.2%) had AB- and 10(4%) had O- (Table 3). The data was stratified for gender and family history of diabetes. Post stratification chi-square test was used. A value of $P < 0.05$ was considered significant (Table 4 & 5).

Table 5: Stratification for family history of diabetes mellitus

Rh blood group type	Family history (n=93)	No family history (n=157)
A+	23	29
B+	26	29
AB+	9	14
O+	32	65
A-	1	1
B-	1	7
AB-	0	3
O-	1	9

P value 0.07

DISCUSSION

Diabetes mellitus (DM) is a syndrome manifested by dysglycemia. The main pathology lying either or both beta cell dysfunction leading to blunted insulin release, and insulin insensitivity. ABO is the dominant blood group domain in humans. The individual's blood group is dependant whether A,or B genes are present. It is hypothesized that blood groups are linked to the occurrence of various diseases in humans.

Todate a lot a research papers are existing, narrating the association of blood groups with diabetes. In our study, out of 250 cases, 45(18%) were between 15-40 years of age while 82% (n=205) were between 41-70 years of age, Mean±SD was calculated as 54.11±9.81 years, 130(52%) were male and 48% (n=120) were females, frequency of ABO and Rh blood groups in patients with diabetes mellitus in the local population group was recorded as 52(20.8%) in A+, 55(22%) had B+, 23(9.2%) had AB+, 97(38.8%) had O+, 2(0.8%) had A-, 8(3.2%) had B-, 3(1.2%) had AB- and 10(4%) had O-.

The findings of our study is coherent with the study published by Al-Ali HS. He included >250 participants who had diabetes with male: female ratio 1:2; group O was the most dominant group 39.31%. Blood group A & B constituted 25.6%, 26.57% respectively, only 8.5% of the studied population had blood group AB. 91.45% people were Rh-positive. A significant difference was observed between B and Rh-positive blood groups amongst healthy and diabetics[10].

Shrestha Sand colleagues published their study results. Interestingly prevalence of group O was equal in diabetics versus healthy participants. The comparative incidence of AB groups in diabetics versus non diabetics were as: AB 14.92% versus 9.87%. A and B (20.37% vs. 27.4% and 28.86% vs. 33.05%. Rhesus negative (12.44% vs. 7.73%[11]. Our findings are in contrast with these results.

Qureshi et al concluded that owing to broad genetic immunologic basis type II diabetes and blood groups are

associated. They narrated their findings that frequency of groups B and O is spuriously higher in those with diabetes as compared to others.[3]

Okon UA and colleagues[12] done a comparative study. An equal no of diabetics and control were enrolled to see the difference in prevalence of ABO. Blood group O- and A+ had significant high prevalence (P<0.01) and group O+ was significantly lower (P<0.01) in diabetics. We can suppose that people with Blood group O- and A+ are more prone to diabetes than the others. In view of above, the controversy still exists in the literature, the limitation of our study was that we did not include a control group which could clear the results however, in coming trials inclusion of control group will be further helpful to clarify this ambiguity in our population.

CONCLUSION

We concluded that the frequency of ABO is significantly higher as compared to Rh blood groups in patients with diabetes mellitus in the local population.

REFERENCES

1. Ali N, Anwar M, Bhalti FA, Nadeem A, Ali M. Frequency of ABO and Rh blood groups in major ethnic groups and casts of Pakistan. Pak J Med Sci, 2005;21(1):26-9.
2. Daniels G. Human blood groups, 2nd edition, Oxford: Blackwell scientific 2002.
3. Qureshi MA, Bhatti R. Frequency of ABO blood groups among the diabetes mellitus type 2 patients. J Coll Physicians Surg Pak, 2003;13:453-5.
4. Watkins WM. Biochemistry and genetics of ABO, Lewis and P blood group systems. Adv Hum Genet year 10:1-36.
5. Waseem AG, Muhammad I, Khan OA, Tahir M. Association of Diabetes Mellitus with ABO and Rh Blood Groups Ann, Pak, Inst, Med, Sci 2012;8(2):134-36.
6. Sharma S, Kumar J, Choudhary R, Soni ND. Study of Association between ABO Blood Group and Diabetes mellitus. Sch J App Med Sci 2014;2(1A):34-37.
7. Ekoe JM, Zimmet P, Williams R. The epidemiology of Diabetes Mellitus: An International Perspective. John Wiley, Chichester.
8. McConnell RB. Discussion on the ABO blood groups and disease. Proc R Soc Med 2010;48(4):291.
9. Anderson J, Lauritzen E. Blood groups and diabetes. Diabetes 9:20–24.
10. Al-Ali HS. Association of ABO and Rh Blood Groups with Diabetes Mellitus and Hypertension in Basrah City. Basrah J Sci 2008;26(1),29-37.
11. Shrestha S, Jha S, Deep G. Case control study of ABO blood group and Rhesus (Rh) factor in type 2 Diabetes Mellitus. Indian J Applied Res 2014;4(4):2249-555.
12. Okon UA, Antai AB, Osim EE, Ita SO. The relative incidence of diabetes mellitus in abo/rhesus blood groups in south-eastern Nigeria. Nigerian J Physiological Sciences 2008;23(1-2):1-3.