

# ANALYSIS OF ABO BLOOD GROUPS AND AGE AT ONSET IN IDDM AND NIDDM

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## ABSTRACT :

Distribution of ABO blood groups and age at onset were analysed in 60 IDDM patients and 137 NIDDM cases. Age and sex matched 110 healthy subjects served as controls.  $\pm$  significant increase was observed in the frequency of  $\pm$  blood group in IDDM patients compared to controls (33.3% in IDDM, 20% in controls) and NIDDM patients did not show any significant difference with regard to frequency of ABO blood groups when compared to controls. Analysis of blood groups in relation to age at onset revealed higher frequency of  $\pm$  blood group in patients belonging to age group 1-10, 11-20, and 21-30 years in IDDM group. Significance of these observations in relation to genetic predisposition to IDDM has been discussed.

**KEY WORDS :** Blood groups : IDDM; NIDDM

## INTRODUCTION :

The role of genetic factors in the etiology of IDDM and NIDDM is well established. Greater concordance in monozygotic twins [1,2], familial clustering of cases [3-5] and association of certain HLA markers are an evidence of the significance of genetic component in the etiology of diabetes [6-8]. ABO blood group distribution [9-12] was also analysed in patients and controls to investigate for a possible association. However most of these studies were carried out prior to classification of diabetic cases into IDDM and NIDDM. This classification relies on requirement of insulin treatment. However age at onset is also taken into consideration while classifying. Not much is known about the comparative analysis of ABO blood group distribution in IDDM and NIDDM subsequent to classification based on insulin requirement. With this objective we investigated ABO blood group distribution in IDDM and NIDDM and also studied the relationship of age at onset with incidence of different ABO blood group types.

## MATERIALS AND METHODS :

Patients visiting the Endocrinology unit of Gandhi General Hospital, Osmania General Hospital and Princess Durru Shehvar Hospital (Hyderabad) were

selected. After provisional diagnosis by clinical examination, blood sugar estimation was done and age at onset was also taken into consideration for diagnosis and classification of cases into IDDM and NIDDM according to WHO criteria. [13]. Fasting blood sugar levels were estimated according to glucose oxidase method, (Glucose Oxidase Kit, GOD-pap/end point, Kaizen Diagnostics, Hyderabad) None of the cases were suffering from malnutrition. The cases were classified as hyperglycemic, when fasting blood sugar levels were more than 120mg/dl. The fasting blood sugar levels were repeated once more to confirm hyperglycemic state in each case. The IDDM cases were found to be positive for ketosis upto withdrawal of insulin, while none of the NIDDM cases showed ketosis. ABO blood groups were detected by the common tile method employed in clinical labs. The number of patients studied was 60 in IDDM group and 137 in NIDDM group and were compared with 110 normal healthy subjects, who served as controls.

## RESULTS :

Results obtained are depicted in tables 1 and 2. Table 1 shows significant increases in the frequency of ' $\pm$ ' blood group in IDDM cases with a percent frequency of 33.3% (20 out of 60 cases) compared to 20% (22 out of 110) in controls. The increase in ' $\pm$ ' blood group

**Table 1: Distribution of ABO blood group in IDDM and NIDDM**

Category	Total n	A		B		AB		O	
		n	%	n	%	n	%	n	%
<b>IDDM</b>									
Male	43	18	41.86*	10	23.26	1	2.3	14	32.56
Female	17	2	11.77	7	41.18	1	5.88	7	41.18
Total	60	20	33.3**	17	28.33	2	3.3	21	35.0
<b>NIDDM</b>									
Male	59	9	15.25	17	28.8	6	10.17	27	45.76
Female	78	13	16.67	27	34.62	4	5.1	34	43.59
Total	137	22	16.1	44	32.1	10	7.29	61	44.5
<b>Controls</b>	110	22	20.0	41	37.3	6	5.4	41	37.3

P < 0.05  $\pm$  vs others

\*\* P < 0.01  $\pm$  vs B

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**Table 2: Distribution of ABO blood groups in relation to age at onset of IDDM and NIDDM**

Category	Total Interval	n	A		B		AB		O	
			n	%	n	%	n	%	n	%
<b>IDDM</b>										
	1-10	8	4	50.0	2	25.0	--	--	2	25.0
	11-20	30	10	33.3	10	33.3	--	--	10	41.18
	21-30	14	7	50.0	4	28.6	--	--	3	21.4
	31-40	10	2	20.0	1	10.0	2	20.0	5	50.0
<b>NIDDM</b>										
	20-30	6	1	16.7	1	16.7	--	--	4	66.7
	31-40	28	4	14.3	12	42.9	2	7.1	10	35.7
	41-50	57	11	19.3	20	35.1	3	5.3	23	40.4
	51-60	26	2	7.7	7	26.9	3	11.5	14	53.9
	61-70	2	--	--	1	50.0	--	--	1	50.0
	71-80	2	--	--	2	100.0	--	--	--	--

in IDDM was significant ( $P < 0.05$ ). When the cases were separated into males and females the frequency of '±' blood group increased to 41.8% in males which was highly significant ( $P < 0.01$ ). This indicates the increased susceptibility of '±' blood group individuals to IDDM, particularly males. ± decrease of about 9% was observed in the frequency of 'B' blood group, 28.3% in patients and 37.3% in controls. No significant change was observed in the frequencies of B,O and AB blood groups. In the NIDDM group an increase of about 8% in the frequency of 'O' blood group was observed. However this increase was not statistically significant. In the NIDDM patients the frequency of 'O' blood group was 44.5% (61 out of 137 cases) while it was 37.3% (41 out of 110 subjects) in controls. With regard to other ABO blood group types, a decrease of about 8.5% was noted in the frequency of 'B' blood group and of 5% in the frequency of '±' blood group.

Table 2 gives details of distribution of ABO blood groups in relations to age at onset of IDDM and NIDDM. Of the total 60 IDDM patients studied, 8 were in the age group of 1-10 years. Of these eight, four (half of them) were of '±' blood group while two each belonged to 'B' and "o" blood groups. In the age group 11-20 years there were 30 patients of which 10 (33.3%) were of '±' blood group and 10 each belonged to 'B' and 'O' blood groups. In the age group of 21-30, years a total of 14 cases were recorded of which 7 (50%) belonged to 'A' blood group. In the age group of 31-40 years only two out of ten were of 'A' blood group, while five were of 'O' blood group.

The age related distribution analysis of NIDDM group showed an early onset in patient with 'O' blood group (66.7% patients belonging to age group of 22-30 years were of 'O' blood group). Relatively higher incidence was observed in 'O' blood group patients in the age groups 41-50 years and 51-60 years when compared to patients with other blood groups. Our results indicate statistically significant increase in the frequency of 'A' blood group in IDDM patients.

## DISCUSSION :

It appears that persons particularly males with 'A' blood group are genetically predisposed to IDDM of early onset. In IDDM group, an increase in the frequency of 'O' blood group was observed which was statistically insignificant. A physiological basis for the observed association of 'A' blood group with IDDM is not known. It is likely that the 'A' blood group substance may be involved in the physiological changes that predispose to IDDM. It is interesting to note that the ABO locus influences pepsinogen secretion [14], a marker linked to insulin gene on chromosome 11 [15].

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