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A.B.O. Blood Groups in Leprosy

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The exact mode of transmission of leprosy is still controversial, despite numerous epidemiolocal studies in leprosy. It has been shown beyond doubt that exposure to the infection is not the sole factor in the spread of the disease since a number of individuals exposed to an open patient do not develop the disease.

A few factors other than mere contact with *Mycobacterium leprae* have recently been emphasized. Genetic factors have been considered significant in this direction (Ali and Ramanujam, 1964, and Ali, 1965) and were recently discussed in an international conference at Washington (Blumburg, 1965, and Lechat, 1965). Hsuen *et al:* (1963) from South India reported an association between the incidence of leprosy and A.B.O. blood groups. They have shown that its incidence is nearly twice in O group as compared to the B group. Beiguelman (1964), however, pointed out that a significant excess of A frequency was found in the lepromatous as compared to the tuberculoid samples. With respect to O frequency, a similar, but slight excess of this group was found among tuberculoid patients as compared to lepromatous patients. On the other hand Sato (1949), Yankah (1965) and Verma and Dongre (1965), recorded no specific relationship between leprosy and A.B.O. blood groups.

The present study was undertaken in Varanasi district in Uttar Pradesh, India, to further evaluate the observations made by aforesaid workers.

Material and Methods

623 patients of leprosy were drawn from the outpatients of Sir Sundar Lal Hospital and leprosaria in Varanasi. The patients were diagnosed clinically by salient diagnostic criteria (Dharmendra, 1960) and classified into lepromatous and non-lepromatous types, whereas in doubtful patients histological studies were undertaken to confirm the clinical impressions.

In the control series 615 first time blood donors at Sir Sundar Lal Hospital were taken for the blood group frequency examination. Only those persons who belonged to Varanasi district were included. Leprosy in all these cases was excluded by thorough clinical examination.

Blood for blood grouping was taken by finger prick method, but where this was not possible, it was obtained from the cubital vein. The blood grouping was done immediately by the slide method.

RESULTS AND DISCUSSION

The frequency distribution of lepromatous and non-lepromatous patients is shown in Table 1.

The distribution of blood groups in control and leprosy patients is given in Table 2.

The statistical analysis of the data reveals that the blood group incidence in control series and leprosy series is significantly different ($X^2 = 41 \cdot 125$ df $= 3$ $p < 0 \cdot 001$) while no significant difference is observed between lepromatous and non-lepromatous leprosy groups in their blood group distribution ($X^2 = 3 \cdot 917$ df $= 3$, $p > 0 \cdot 20$). On further analysis of the data comparing the blood group distributions of control, lepromatous and non-lepromatous series separately it is found that the blood group distributions of the two types of leprosy are significantly different from the control series ($X^2 = 11 \cdot 510$ df $= 3$ $p < 0 \cdot 01$) and $X^2 = 41 \cdot 728$ df $= 3$ $p < 0 \cdot 001$ respectively).

The B group in control series is 39·7% while in Leprosy series is 25·4%. This differ-

TABLE I

Type	NUMBER OF PATIENTS	
	Number	*Percentage*
Lepromatous	169	27·13
Non-Lepromatous	454	72·87
Total:	623	100·00

TABLE 2

Distribution of Control and Leprosy Series According to their Blood Groups

Blood Group	*Control Series*		*Lepromatous Series*		*Non-Lepromatous Series*		*Combined*	
	No.	%	No.	%	No.	%	No.	%
A	119	19·3	49	29·0	155	34·2	204	32·7
B	244	39·7	49	29·0	109	24·0	158	25·4
O	191	31·1	59	34·9	144	31·7	203	32·6
AB	61	9·9	12	7·1	46	10·1	58	9·3
Total:	615	100·0	169	100·0	454	100·0	623	100·0

ence is highly significant ($X^2 = 28·92$ df $=$ 1 $p < 0·001$).

While the A group is found in excess in the leprosy series (control 19·3% and leprosy 32·7%), this difference is also significant ($X^2 = 29·80$ df $= 1$ $p < 0·001$). It is evident from the data charted above that there is an association between leprosy and blood groups. Observations of the present series are thus in conformity with the results of those of Hsuen *et al.* (1963) and Beiguelman (1964) who have reported an association between leprosy and blood groups. However, these results do not support the observations of Yankah (1965) from Ghana and Verma and Dongre (1965) from Baroda.

SUMMARY

623 patients of leprosy and 615 normal controls have been studied in a section of the community in Varanasi district, UTTAR PRADESH, INDIA. The distribution of A.B.O. blood groups in relation to leprosy is analysed and it seems that there is an association between leprosy and A.B.O. blood groups.

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An Appendix to the Article

A.B.O. Blood Groups in Leprosy

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The distribution of individuals according to their blood groups varies from group to group. Especially in a country like India which has various tribes and groups of people, there are many blood group distributions. This difference is even more predominant from one part of India to the other.

Various studies have been done on the comparison of blood group distribution of normal persons with leprosy patients (Tables 1 and 2). Amongst them Hsuen *et al.* (1963) from South India have shown that the blood group distributions of normal and leprosy patients are significantly different. Verma *et al.* (1965) from

TABLE 1

Showing the Blood Group Distribution of Normal Persons and Leprosy Patients by Various Workers in India

Blood Group	*South India* HSUEN *et al.* (1963)				*Baroda District* Verma *et al.* (1965)				*Varanasi District* *Sehgal *et al.* (1966)			
	Control Series		*Leprosy Series*		*Control Series*		*Leprosy Series*		*Control Series*		*Leprosy Series*	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	214	21·4	130	24·7	242	24·2	156	26·3	119	19·3	204	32·7
B	331	33·1	123	23·4	347	34·7	231	38·9	244	39·7	158	25·4
O	397	39·7	257	48·9	335	33·5	177	29·8	191	31·1	203	32·6
AB	58	5·8	16	3·0	76	7·6	30	5·0	61	9·9	58	9·3
Total	1000	100	526	100	1000	100	594	100	615	100	623	100

*Present Series

TABLE 2

Showing the Blood Group Distribution of Lepromatous and Non-Lepromatous Types of Leprosy by Various Workers in India

Blood Group	*South India* HSUEN *et al.* (1963)				*Baroda District* Verma *et al.* (1965)				*Varanasi District* *Sehgal *et al.* (1966)			
	Lepromatous		Non-Lepromatous		Lepromatous		Non-Lepromatous		Lepromatous		Non-Lepromatous	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	62	24·0	68	25·4	74	25·7	82	26·8	49	29·0	155	34·2
B	68	26·4	55	20·5	111	38·5	120	39·2	49	29·0	109	24·0
O	121	46·9	136	50·8	92	31·9	85	27·8	59	34·9	144	31·7
AB	7	2·7	9	3·4	11	3·8	19	6·2	12	7·1	46	10·1
Total:	258	100	268	100	288	100	306	100	169	100	454	100

*Present Series

Baroda have stated that there is no significant difference between the two groups in their blood group distributions. Further in the series reported in this article from Varanasi an association is found between leprosy and blood group distribution.

On a comparison of the blood group distribution of the normals as well as the leprosy patients, separately, in these three series it is observed that the distributions are significantly different ($X^2 = 27{\cdot}63$ $P < 0{\cdot}001$ for normals and $X^2 = 87{\cdot}73$ $P < 0{\cdot}001$ for leprosy patients).

If a consolidated study of all these 3 groups is to be made it is not advisable to conjoin the observations of control and leprosy patients of all the 3 series into their respective blood groups. Hence a suitable method used by Doll & Hill (1956) and referred to by Radhakrishna (1965) to conjoin the data from different contingency tables is utilised.

By this method we calculate X^2 from the formula $X^2 = \Sigma \frac{(O-E)^2}{E}$ where O and E are the cumulative observed and expected values in each of the cells calculated on the basis the respective individual distributions.

Analysing the data utilising the above method the following results are observed:

1. The blood group distributions of control and leprosy series are significantly different ($X^2 = 32{\cdot}93$ $P < 0{\cdot}001$).
2. No significant difference is observed between Lepromatous and Non-Lepromatous types of leprosy in their blood group distributions ($X^2 = 4{\cdot}995$ $P > 0{\cdot}10$).
3. An excess of A group is observed in the leprosy series compared with the control series ($X^2 = 18{\cdot}98$ $P < 0{\cdot}001$).
4. An excess of B group is found in the control series compared with the leprosy series ($X^2 = 16{\cdot}75$ $P < 0{\cdot}001$).

All these results are in conformity with the observations of Hsuen *et al.* and the author's present series of Varanasi data.

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