

# INCIDENCE OF Rh(D) NEGATIVE POPULATION AT ALIGARH

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Karl Landsteiner and Wiener (1940) discovered that the sera obtained from immunised rabbits against the red cells of the Rhesus monkey (*Macaca rhesus*) agglutinated approximately 85% of the human red cells and according to the presence of this factor (Rhesus factor) they divided the whole population into Rh positive individuals and Rh negative ones in whom this factor was absent. The incidence of Rh(D) negative population varies a lot in different races and in different countries. In the Burmese it is reported to be zero per cent, whereas it is about 45 per cent amongst Basques. In white races it varies from 15 to 17%.

Many reports have been published from different parts of our country about the incidence of Rh(D) negative cases which varied from 1.1% (Bird, 1946) to 10.00% (Greval, *et al*, 1943 and Das Gupta, 1944). Reports from Uttar Pradesh are very few. Majumdar (1948) from Lucknow reported the incidence as 5.43%

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and Yadav *et al* (1963) from Kanpur as 3.34%. The present study was taken to find out the incidence of Rh(D) negative cases in the population of Aligarh and its neighbouring districts, with special reference to assess any significant difference of the incidence between Hindus and Muslims. At Aligarh it was quite easy to group a good number of individuals from both the communities. No such report has come to our notice where the incidence of Rh(D) negative cases between the two communities was studied.

## Material and Methods

2,854 individuals were tested for Rh grouping during 1966-67, at the Blood Bank Organisation of Department of Pathology, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh. Persons from both Hindu and Muslim communities of the city were grouped. They were generally the students of the University who got their names registered for voluntary donation during emergency and the patients referred to the Haematology section of the department for routine investigations. Women were grouped during pregnancy at Dufferin Hospital, Aligarh.

Rh grouping of fresh samples was done with the help of anti-D serum

obtained from Bharat Laboratories, Bombay, by slide agglutination method. The serum was of human type. Usually, whole blood samples were used for grouping, but in anaemic patients a 45% suspension of cells was prepared in patient's own serum. The slides were warmed to 40° to 45°C on a specially designed Rh typing box. The presence of agglutination was noted within 2 minutes.

### Results

Out of 2,854 individuals grouped, 1,511 were Hindus and 1,343 Muslims and the incidence of Rh(D) negative cases was 3.18% and 3.72% respectively, while the overall incidence was 3.43%. The variation of incidence between males and females in the two communities was negligible as shown in Table 1. In all, 1,281

incidence of Rh(D) negative males in Hindus and Muslims was 3.28% and 3.72% respectively, and 3.49% when reviewed together.

### Discussion

The incidence of Rh(D) negative population has been found to vary from 1.1 to 10.00% as reported by different workers in our country. The reasons for reporting high incidence may be several, e.g. number of cases studied, type of anti-D serum used and selection of particular groups of people in the population. Both Greval, *et al* (1943) and Das Gupta (1944) reported 10.00% incidence by using anti-D serum obtained from immunised rabbits against red blood cells of Rhesus monkey. The incidence reported by using anti-D serum (human type) is definitely on

TABLE I  
Showing Incidence of Rh(D) negative population at Aligarh

Community	Sex	Number of persons grouped	Rh(D)+ve individuals	Percentage	Rh(D)-ve individuals	Percentage
Hindus	Males	793	767	96.72	26	3.28
	Females	718	696	96.94	22	3.06
Total	Both sexes	1511	1463	96.82	48	3.18
Muslims	Males	780	751	96.28	29	3.72
	Females	563	542	96.27	21	3.73
Total	Both sexes	1343	1293	96.28	50	3.72
Grand Total	Both sexes	2854	2756	96.57	98	3.43

females were grouped, out of which 718 were Hindus and 563 Muslims and the incidence of Rh(D) negative in these groups was 3.06% and 3.73% respectively. The overall incidence in females was 3.36%. The

the lower side. In the present series the overall incidence of Rh(D) negative individuals was 3.43%. Similar incidence or near about that has been reported by Sen *et al* (1959) from Bengal, Anand (1962) from Rajas-

than, Yadav *et al* (1963) from Kanpur, Rao (1952) and Rangnathan *et al* (1946) from South India, (Table 2).

As the sample size is very large we applied a significant test for proportion of normal distribution by the following formula:

TABLE II  
Showing Incidence of Rh(D) negative population as reported by other workers

Year	Author	Nature of Population	Total cases studied	Percentage of Rh(D)-ve cases
1943	Greval <i>et al</i>	Indians, Calcutta (both sexes)	200	10.00
1944	Das Gupta	Indians Calcutta (both sexes)	240	10.00
1945	Khanolkar <i>et al</i>	Indians, Bombay	100	2.00
1946	Greval <i>et al</i>	Indians, Calcutta (both sexes)	200	7.80
1946	Bird	Indians	390	1.1
1946	Rangnathan <i>et al</i>	Indians, Madras	145	4.14
1948	Rangnathan <i>et al</i>	South Indians, Madras	294	8.50
1948	Majumdar	Indians, Lucknow	116	5.43
1949	Prasad	Indian Students, London	105	9.5
1949	Sanghvi <i>et al</i>	Koksnath Brahmans, Bombay	200	3.5
		Chandra Saniya Prabhus, Bombay	200	10.00
1952	Rao	South Indians	132	3.79
1953	Venkataramaih and Krishna Rao	Indians, Madras	100	8.00
1954	Pathak	Punjabis (both sexes)	227	7.49
1955	Bird	Indians, Poona	408	7.5
1959	Pathak	Punjabis (females only)	530	7.3
1959	Talwar <i>et al</i>	Punjabis (both sexes)	1000	7.3
1959	Roy <i>et al</i>	Bengal (both sexes)	1435	5.29
1959	Sen <i>et al</i>	Bengal (females only)	2200	3.00
1962	Anand	Rajasthan (males only)	400	2.25
		" (females only)	600	3.16
1963	Yadav <i>et al</i>	Indians, Kanpur (both sexes)	1680	3.34
1968	Tyagi <i>et al</i> (present series)	Indians, Aligarh		
		Hindus (both sexes)	1511	3.18
		Muslims (both sexes)	1343	3.72

Statistical Evaluation of Incidence of Rh(D) Negative Cases Between Hindus and Muslims

The incidence of Rh(D) negative population between the two communities could be expressed as follows: (Table 3).

$$T = \frac{p_1 - p_2}{\sqrt{pq \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

where  $p_1 = 48/1511$  i.e. = 0.31,  
 $p_2 = 50/1343$  i.e. = 0.37,  
 $n_1 = 1511$ ,  $n_2 = 1343$  and  
 $p = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2}$  and  $q = 1 - p$ .

TABLE 3  
Showing the Incidence of Rh(D) negative cases between Hindus and Muslims

	Total cases	Number of Rh(D) negative cases	Proportion
Hindus	1511 ( $n_1$ )	48	0.31 ( $p_1$ )
Muslims	1343 ( $n_2$ )	50	0.37 ( $p_2$ )

Applying the values in the above formula  $T = -0.85$ .

As the value of  $|T|$  is less than 1.96 we could accept the hypothesis of  $\hat{\Lambda}_H = \hat{\Lambda}_M$  i.e. there is no significant difference between Hindus and Muslims as regards the incidence of Rh(D) negative cases.

Therefore, statistically there was no significant difference in the incidence between Hindus and Muslims in the present series. The variation of incidence between males and females in the two communities was also insignificant.

The incidence of Rh(D) negative females was 3.36% in the present series. An idea of the incidence of haemolytic diseases in the newborn can be obtained from this figure as it is very much directly related to the incidence of Rh(D) negative females in the population. Bevan (1961) reported that 6 babies in every 1000 deliveries are affected due to Rh isoimmunisation where the incidence of Rh(D) negative individuals in the white race is 15-17%. On the basis of the above data the incidence of haemolytic diseases in the newborn at Aligarh could be roughly 12 in 10,000 deliveries. Unfortunately, such an incidence has not yet been surveyed in this state and there is enough scope for further studies to be carried out in the field of isoimmunisation in females.

#### Summary

1. Two thousand, eight hundred and fifty-four individuals were grouped for Rh typing by anti-D serum (human type). Amongst

them 1,511 were Hindus and 1,343 Muslims.

2. The Rh(D) negative incidence in the two communities was 3.18% and 3.72% respectively and the overall incidence was 3.43%.

3. The difference between the two communities was not significant statistically.

4. No significant difference in the incidence between the two sexes in both communities was noticed.

5. The Rh(D) negative incidence in males was 3.49% and in females 3.36%.

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