

# CHANGING PATTERN OF RHESUS (Rho. D.) BLOOD GROUP IN RAJASTHAN

(A hospital based study of 3195 females of reproductive age group)<sup>1</sup>

by

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## Introduction

The study of the change in the incidence of Rh blood group in females is vital, because the incidence of haemolytic disease of newborn in a particular population, is closely associated with Rh negative female population. This has become more important, since at present the Rh haemolytic disease of newborn is completely preventable (Dudok *et al* 1968). Such data are also necessary for planning, to prevent this dreadful disease in the community. The interhospital differences are of common occurrence. Hence an idea of particular norm is essential for better planning of local health services (Wootton and King, 1953). The incidence of Rh haemolytic disease of newborn is directly related to the percentage of Rh negative females in the population, hence an awareness of the current incidence will help in better and

effective utilization of existing health services to prevent Rh haemolytic disease of the newborn. The present study was aimed to find out current incidence of Rh negative females attending this medical centre and to compare these figures from previous studies conducted in this institution over a period of last 17 years. It was also aimed to unveil the fact that Rh blood group incidence is not static, and to find out the cause for the change in the incidence.

## Material and Methods

In the present study, 3195 subjects (all females) were screened randomly for Rh and ABO blood group at State Zenana Hospital, Jaipur from June 1977 to December, 1979. The age of these cases ranged from 16 to 44 years. These cases hailed from various parts of Jaipur city and nearby rural area. Blood grouping was done in following cases:

1. Pregnant females attending antenatal clinic.
2. Obstetric and gynaecological cases requiring blood transfusion.
3. Female donors attending blood bank of Hospital.
4. Outdoor cases who were under in-

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vestigation for one or other cause e.g. bad obstetric history.

All these subjects were from different ethnic and religious groups. These cases also included mothers with known history of Rh isoimmunization. Two ml of blood was collected from each case in a citrated vial containing 1 cc of 3.8% sodium citrate. The high protein slide technique of Levins and Macfate (1961) was used for Rh blood grouping using 30% bovine albumin solution. In doubtful cases test tube modification was used. Anti 'D' solution was from Associated Lab. Pvt. Ltd. India and was stored at 4°C. It contained sodium azide as preservative. Four drops of resuspended RBC in plasma and 2 drops of serum were taken for slide testing technique. Results were taken as Rh positive when there was clumping and as Rh negative when there was no clumping.

#### Observations

In the present series, the overall incidence of Rh (D) negative blood group in females was 6.42% (Table I) and Rh (D) positive was 93.58%.

The distribution of cases with religious and ABO blood group is given in Table I.

The maximum Rh -ve cases are from Hindu community (80.97%) and minimum from Christian (5.35%). With ABO group it is evident from Table I that maximum cases are in B negative group (34.63%) and minimum in AB negative group (10.24%). Similar observations are also seen with Rh positive blood group.

Taking in consideration comparative incidence, it is seen that Hindus represented 5.19% of total Rh negative group and Muslims 0.65% (i.e. 8% of the incidence in Hindus) and Christians showed an incidence of 0.34% (i.e. 4% of the incidence in Hindus) (Table II). In miscellaneous group there were 7 cases (0.21%) (Table II). These cases represented subjects from Bengalis, Keralite and Parsee communities. These observations showed dominance of Hindu community which is well accepted, although absolutely the Rh negative blood group incidence in Muslims and Christians is high (Table I). Percentage breakup of cases is shown in Table I with ABO groups, which indicates that A and O groups have approximately equal Rh-negative subjects but unequal Rh positive

TABLE I  
Distribution of Rhesus Blood Group in Relation to Religion and ABO Blood Group

Religion	Rh. negative					Rh. positive				
	A	B	AB	O	Total (%)	A	B	AB	O	Total (%)
Hindu	46	59	15	46	166 (80.97)	500	1013	270	796	2579 (80.71)
Muslim	7	8	2	4	21 (10.24)	80	117	24	80	301 (9.42)
Christian	2	3	2	4	11 (5.36)	20	17	8	20	65 (2.03)
Miscellaneous	1	1	2	3	7 (3.41)	20	13	2	10	45 (1.40)
Total	56	71	21	57	205	620	1160	304	906	2990
%	(27.31)	(34.63)	(10.24)	(27.80)	(6.42)	(20.73)	(38.79)	(10.16)	(30.30)	(93.58)

subjects. However, from AB the incidence for Rh positive and Rh negative is approximately equal.

TABLE II  
Percentage Break-up of Rhesus Negative Cases With Religion

Religion	Rh negative	Rh positive
Muslim	0.65%	9.42%
Hindu	5.19%	80.71%
Christian	0.34%	2.03%
Miscellaneous	0.21%	1.40%
Total	6.42%	93.58%

#### Discussion and Conclusion

The incidence of Rh negative blood group has been extensively studied all over the world, first report from India over incidence of Rh blood group was by Grewal and Chowdhary (1943). Looking at the incidence of Rh negative blood group (Tables III and IV) it is evident that the percentage of Rh negative persons in the community varies from place to place and from time to time at the same place. The reported incidence varies from 35.66% in Basques (Etchevery; 1947) to nil in Burma (Mollison and Reddy; 1946). Available reports from India also show marked difference in incidence of Rh negative blood group at dif-

ferent places, it varies from 2.04% (Roy *et al* 1959) to 10% Grewal and Chowdhary (1943), it is also remarkable that the incidence reported from the same place varies widely from worker to worker such as Roy *et al* (1959) reported an incidence of 5.3% in Bengal, while Sen *et al* (1959) from the same place reported it as 3% (Table IV). This difference may be due to the difference in ethnic groups included in these studies or this may be because of different sizes of samples taken for study.

Grewal and Chowdhary (1943); Rao (1952); Murry (1961), Mollison and Reddy (1946) have taken very small samples for study which might be misleading when results are applied to whole population.

The incidence of Rh negative blood group in females also varies from 2.04% Roy *et al* (1959) to 7.3% Pathak (1959) in various studies (Table IV). Most interesting feature in the present series is the change in the incidence of Rh negative females attending the same medical centre (namely State Zenana Hospital, Jaipur) over a long duration.

Three studies carried out, over a period of 17 years showed gradually increasing number of Rh negative females attending this institution. This clearly exhibited

TABLE III  
Incidence of Rh Negative Blood Group as Reported by Various Workers (Both Sexes)

S. No.	Author and Year	Place of study	No. of cases	% of Rh. negative cases
1.	Grewal and Choudhary 1943	Calcutta	200	10
2.	Boorman <i>et al.</i> 1942	English	1610	14.84
3.	Mollison and Reddy, 1946	Burma	229	Nil
4.	Murry, 1961	English	136	18.5
5.	Etchevery, 1947	Basques	250	35.66
6.	Rao, 1952	South India	116	3.79

TABLE IV  
Incidence of Rhesus Blood group as reported by various workers (in females)

S. No.	Author and Year	Place of study	No. of cases	% of Rh. negative cases
1.	Pathak, 1959	Punjab	550	7.3
2.	Sen <i>et al.</i> 1959	Bengal	2,200	3.0
3.	Tyagi, 1965	Aligarh	2,854	3.43
4.	Roy <i>et al.</i> 1959	Bengal	1,027	2.04
5.	Anand, 1962	State Zenana Hospital Jaipur	600	3.16
6.	Tikkiwal, 1972	-do-	1,000	5.20
7.	Arvind <i>et al.</i> 1979	-do-	2,240	6.11
8.	Present series	-do-	3,195	6.42

rising trend in Rh negative female population of this area when compared with the present series (Table IV).

In the present series the incidence of Rh negative blood group in females was 6.42%; in this regard our values differ completely from various figures reported previously by different authors (Table IV). However, exact comparison is not possible on account of different size of samples taken by various authors (Table IV).

Regarding the effect of religion over Rh negative blood group, maximum Rh negative cases were from Hindu community (5.19%) and minimum from Christian community (0.34%); the Muslims were 0.65%. The figures reported in the present series from Muslims are lower than 3.73% reported by Tyagi (1968); and 1.85% Tikkiwal (1972). It is noteworthy that Tikkiwal (1972) reported almost three times the incidence of Rh negative females in Muslims than in the present series, from same Institution. This may be due to decrease in number of Rh negative females in Muslim community of this area. It is also possible that the difference in these two studies may be because of different size of samples. Similarly, in Hindus the Rh

negative females were 5.19% in the present series which is higher than that reported by Tikkiwal (1972). This may again be due to either absolute increase in Rh negative blood group in Hindu females or less so due to difference in sample size.

The incidence of Rh negative blood group in females as noted by us was 6.42% which is twice the values reported by Anand (1962) and 20% higher than the values reported by Tikkiwal (1972) from the same Institution. However, this is slightly on the higher side from the values reported by Arvind *et al.* (1979) from the same Institution (Table IV). In this context it is our feeling that this increase in number of Rh. negative females represents an absolute increase in Rh negative blood group incidence in this population of Rajasthan, over last 17 years.

We propose that this change in incidence may be due to the change in structure of population over this long duration because of various socio-cultural factors; the change in ethnic groups and change in catering area of this Medical Centre. This is also possible that shift of population (floating population) and increased consciousness in profession of the value

of Rh blood group determination (increased rate of screening of attending population for Rh blood group) are added factors for this high incidence.

From the present series it is indicated that an absolute increase in Rh negative females population cannot be ruled out clearly and similar changes might also be occurring at other places. This suggests repeating the studies for establishing new norms over the old ones in various population groups. This is vitally important as knowledge of Rh negative female population is directly related to Rh haemolytic disease of newborn, which is completely preventable (Dudok *et al* 1968). Finally, as this is a vital issue in perinatal medicine, as the Rh negative female if sensitized is completely ruined of her reproductive life, this needs a continuous and cautious watch over changing pattern of Rh negative blood group, because increasing incidence of Rh negative females is associated with the increasing incidence of Rh haemolytic disease of newborn with permanent damaging effect over reproductive life of female and mental and physical well being of affected newborn.

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