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Effects of Consanguinity on Blood Groups and Intelligence Quotient Among Muslim Children of Purnia, Bihar

B.N. Pandey, A.K. Jha and P.K.L. Das
Post Graduate Department of Zoology, Purnia College, Purnia 854 301, Bihar, India

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ABSTRACT Consanguineous marriages are common in Muslims. Consanguinity leads to homozygosis. A survey was made to assess the effects of consanguinity on the ABO blood groups and I.Q. in Muslims of Purnia, Bihar. A non-consanguineous population served as control. A trend of B> A> O> AB was observed in non-consanguineous and O> B> A> AB in consanguineous populations, respectively. The alteration in phenotypic distribution indicated a trend of selection for the recessive trait (O blood group) due to consanguinity. Likewise, I.Q. of inbred children was found to be lower than that of outbred ones.

INTRODUCTION

Whether or not a marriage is biologically evil, it decidely becomes so when it is consanguineous. Marriage between family relatives is known as consanguineous marriage. Such marriages are influenced by various factors *viz.* religion (Schull et al., 1962; Devi et al., 1982), socio-economic status (Schull and Neel, 1965, 1972), martial distance between birth places of spouses (Imaizumi, 1977, 1978), caste (Dronamraju and Meera Khan, 1960), and geographical isolation (Imaizumi et al., 1975). Consanguinity brings about homozygosis of recessive alleles (Jones, 1924) that are present in heterozygous condition both for single as well as for polygenic characters. Thus, consanguinity contributes to the phenotypic variance (Crow and Kimura, 1970) and hence to the genetic variability (Jensen, 1983). To study the effects of consanguinity, two genetic characters the ABO blood groups and I.Q. have been investigated in the Muslim children born from consanguineous marriages.

The ABO blood groups are single gene traits and good genetic markers for population studies. Intelligence quotient (I.Q.) is of polygenic inheritance involving near about hundred genes. Sociological intelligence is the application of I.Q. in practical situations of every day life. It is often considered as equivalent to successful adaptation (Lehrl et al., 1991). The factors like age, sex and levels of inbreeding have some effects on these characters (Badaruddozoa and Afzal, 1992). Low intelligence and academic achievement of children have been shown to be related with poor qualities of child care, neighbourhood, moral and schooling (Wiseman, 1964).

MATERIAL AND METHODS

A survey of Muslim families residing in the suburban localities of Purnia, Bihar was made and detailed pedigree of the family was drawn. The children belonging to the age group of 8-12 years were selected for blood group and I.Q. tests; only one child of a family was considered for the present test. I.Q. test was conducted with the help of Mohsin's intelligence scale. During the test, every instruction in the manual for conducting the test was followed. The performance of each child was noted on a record forum provided, and test scoring was done with the help of a key. The blood groups were determined by slide agglutination method using anti-A and anti-B reagents. The ABO gene frequencies were calculated according to Mourant et al. (1976).

Children born from non-consanguineous marriages were surveyed to facilitate comparison.

RESULTS AND DISCUSSION

The distribution of the ABO blood groups and their allele frequencies are shown in tables 1 and 2, respectively. The incidence of blood group AB was lowest in both non-consanguineous and consanguineous populations. Blood group B was more or less in equal frequency in both populations. From table 1 it is quite clear that blood group O is more prevalent among consanguineous marriages. Thus in consanguineous marriage there is a significant decrease in the frequencies of AB, B and A blood groups compared to O blood group. From figure 1 it is quite clear that

(a) in children born from non-consanguineous marriages the pattern is *A*>*B*>O,

(b) but in children born from consanguineous marriages, in comparison to alleles *A* and *B*, alleles *O* shows increased frequency *(O>B>A)*.

Table 1: Distribution of the ABO blood groups

Blood group	Population			
	Non-consanguineous		Consanguineous	
	n	%	*n*	%
O	50	25.64	81	41.11
A	60	30.76	36	18.27
B	75	38.46	72	36.54
AB	10	5.12	8	4.06

It is thus concluded that due to consanguinity, the proportions of groups A and B have been reduced while that of homozygous recessive O have been increased. However, Rao and Inbaraj (1977, 1979) could not find such effect among the consanguinity practising Brahmins of Tamil Nadu and Maharashtra. This may be attributed to differences in the history and marriage structure of the populations concerned.

Table 2: Allele frequencies of the ABO blood groups

Population	*A*	*B*	*O*
Non-consanguineous	54	25	20
Consanguineous	12	23	65

Table 3: Frequency distribution of children on different I.Q. classes

Class interval of I.Q. values	Population	
	Non-consaguineous	Conganguineous
40-49	0	0
50-59	5	6
60-69	10	15
70-79	18	21
80-89	35	38
90-99	30	30
100-109	25	24
110-119	10	25
120-129	22	1
130-139	15	0
n	170	160
$\bar{X} \pm$ SE	97.4± 0.66	90 ± 0.58
SD	8.62	7.31

The I.Q. values in both populations have normal distribution (Table 3). In neither of the populations any child having this value less than 40 or more than 140 was found. There was a distinct low I.Q. value among the children born from consanguineous marriages. The studies of Bashi (1977) and Afzal and Sinha (1983) have shown that inbreeding causes depression in I.Q. Previous studies by other workers corroborates this trend (Schull and Neel, 1965). No significant difference was found between the I.Q. of boys and girls within either population. According to Eysenck (1973), the lowering of I.Q. after inbreeding is perhaps among the best lines of evidence for hereditary control of intelligence.

Such differences are mostly due to significant decrease in the frequency of dominant homo- or hemi-zygous phenomenon types (blood groups, I.Q.); conversely, the frequency of recessive phenotypes has increased. The

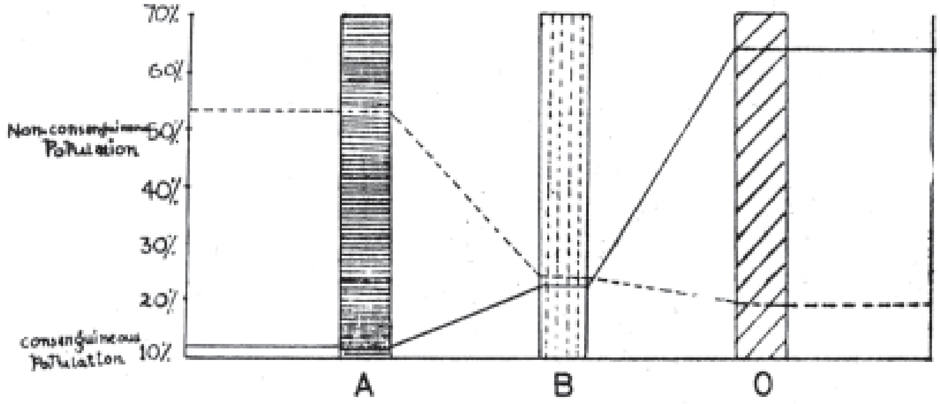

Fig. 1. Distribution of the ABO blood group frequencies

present results thus demonstrate that consanguinity as expected (Jones, 1924), leads to homozygosis of recessive alleles. Thus, it could be concluded that in view of the adverse effect on I.Q., the practice of consanguineous marriages should be discouraged. In fact, there are some rare diseases such as albinism, phenylketonuria, amaurotic idiocy, alkaptonuria, total colour blindness, icthyosis and xeroderma pigmentation which are brought about by increased homozygosis of rare recessive alleles in consanguinity

REFERENCES

Afzal, M. and Sinha, S.P. : Consanguinity effects on intelligence quotient and neonatal behaviours of Ansari Muslim children. *Proc. Ind. Nat. Sci. Acad., B49:* 407-411 (1983).

Badaruddozoa and Afzal, M.: Inbreeding in the human populations. *Man in India, 74:* 431-453 (1992).

Bashi, J.: Effects of inbreeding on cognitive performance. *Nature, 266*: 440-441 (1977).

Crow, J.F. and Kimura, M.: *An Introduction to Population Genetics Theory.* Harper and Row, New York (1970).

Devi, A.R.R., Rao, A. and Bittles, A.H.: Inbreeding in the state of Karnataka, South India. *Hum. Hered., 32:* 8-10 (1982).

Dronamraju, K.R. and Meera Khan, P.:Inbreeding in Andhra Pradesh. *J. Hered., 51:* 239-242 (1960).

Eysenck, H.J.: In *The Inequality of Man.* San Diego, California (1973). *Cited from Perspectives in Cytology and Genetics.* G.K. Manna and U. Sinha (Eds.). *4 :* 111-114 (1984).

Imaizumi, Y., Shinozaki, N. and Aoki, H.: Inbreeding in Japan: Results of a nationwide study. *Jap. J. Hum. Genet., 20:* 91-107 (1975).

Imaizumi, Y.: A demographic approach to population structure in Gyodo and Husuda. *Jap. J. Hum. Hered., 27:* 314-327 (1977).

Imaizumi ,Y.: Population structure in Kanoya population. *Jap. J. Hum. Hered., 28:* 7-18 (1978).

Jensen, A.R.: Effects of inbreedig on mental ability factors. *Person. Individ. Diff., 4:* 71-87 (1983).

Jones, D.F.: The attainment of homozygosity in inbred strains of maize. *Genetics, 9:* 405. (1924).

Lehrl, S., Frank, S. and Papp, R.: Overcoming the limitations of I.Q. *Mankind, 32*: 137-151 (1991).

Mourant, A.E., Kopec, A.C. and Domaniewska-Sobczak, K.: *The Distribution of the Human Blood Groups and Other Polymorphisms.* Oxford University Press, Oxford, 2nd Edition (1976).

Rao, P.S.S. and Inbaraj, S.G.: Inbreeding effects on human reproduction in Tamil Nadu of South India. *Ann. Hum. Genet., 41:* 87-98 (1977).

Rao, P.S.S. and Inbaraj, S.G.: Inbreeding effects on fertility and mortality in Southern India. *J. Med. Genet., 16:* 24-31 (1979).

Schull, W.J.T., Yanase and Nemato, H.: Hiroshima : The impact of religion on an islands genetic heritage. *Hum. Biol., 34:* 271-298 (1962).

Schull, W.J.T. and Neel, J.V.: *The Effects of Inbreeding on Japanese Children.* Harper and Row, New York (1965).

Schull, W.J.T. and Neel, J.V.: The effects of parental consanguinity and inbreeding in Hirado Japan. Summary and interpretation. *Am. J. Hum. Genet., 24;* 425-453 (1972).

Wiseman, S.: *Education and Environment.* University Press, Manchester (1984).