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ABO Blood Group Incompatibility among the Bengali Muslims of Cachar District, Assam

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ABSTRACT Present study is an attempt to investigate the fertility performance with reference to ABO incompatibility among 89 Bengali Muslim fertile couples of Cachar District, Assam. The findings of the present study reveal that mean conception and mean live birth are more among the compatible couples but mean pregnancy wastage, particularly miscarriage, is high among the incompatible couples.

INTRODUCTION

ABO blood group has been studied widely for their association in incompatibility selection. The basis of human ABO system is based on antigenic property of red blood cells (RBC). The human body generates antibodies against whichever blood group antigens it lacks (Martin et al. 2008). Human beings with group A generate anti-B antibodies while those with group B generate anti-A antibodies. According to the presence of these antigens and antibodies, blood is divided into four major groups called A, B, AB and O. The presence or absence of these antigens and antibodies leads in a number of cases to an incompatibility between maternal serum and fetal antigens inherited from the father (Allan 1953).

In compatible mating blood factors of the father and the mother are identical or in which the mother carries the dominant blood factor. But in case of incompatible mating the mother is lacking the dominant blood factor, which is present in the fetus (Bottini et al. 2001). Fetal loss and hemolytic disease of the newborn may result from such a situation (Cohen 1970). Levine (1943, 1958) showed that apart from Rh (D) incompatibility, ABO incompatibility also led to fetal wastage and haemolytic disease of the newborn. Banerjee (1980) and Srikumari et al. (1987) also reported of high pregnancy wastage in incompatible mating. It is an established fact that fertility of a woman is affected by many biological and socio-cultural factors (Hussain and Bittles 2004; Raj 2005; Khiloni 2009; Nazarabadi et al. 2012). But in the present study it has been tried to see the reproductive performance of Bengali Muslims with reference to ABO incompatibility only.

The main aim of the present study is to study the fertility performance especially reproductive wastage in relation to ABO incompatibility among the fertile Bengali Muslim couples of Cachar district, Assam.

MATERIAL AND METHODS

The present study has been carried out among the Bengali Muslims of two villages namely, Bhaurikandi Part-II of Sonai Block and Ganganagar Part-I of Palonghat Block of Cachar District of Assam. Cachar district is one of the largest districts, located in the southern part of Assam. There are different endogamous ethnic communities inhabiting the district such as Bengali, Meitei, Brishnupriya, Dimasa Kachari, Hmar, Khasi, etc. The people inhabiting in the district are mostly Bengali speaking people of Hindu and Muslim religion. Marriage by negotiation is the widespread practice and consanguineous marriage is also present among them. Rice is their staple food and agriculture is their mainstay of livelihood.

The data has been collected by following household census method among 89 willing Bengali Muslim couples of Sonai Block and Palonghat Block of Cachar District, Assam. Fertility performance has been recorded from the above mentioned 89 ever married Bengali Muslim women who have at least one live birth and below 70 years of age. ABO blood grouping of these couples were done on the spot by follow-

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ing open slide technique using anti-A and anti-B obtained from Tulip Diagnostics (P) Ltd. All Statistical Analysis has been carried out by SPSS 16.0 version. Chi-square test, Independent t-test and ANOVA test was performed and a *p* value of <0.05 was considered as significance. Analysis has been carried out by considering conception, live birth, still birth, induced abortion, spontaneous abortion and total reproductive wastage as continuous variable.

RESULTS AND DISCUSSION

It is observed from the ABO blood group combinations of the couples that almost 40 percent (39.33%) of the couples are ABO incompatible. Present study considered only those couples who had at least one live birth. Most of the couples (85.4%) did not experience pregnancy wastage at all. Slight difference is noticed between ABO compatibles (85.2%) and incompatibles (85.7%), when it is seen in the light of couples who have only live birth. Couples having both live birth and spontaneous abortion is found to be high among incompatibles (5.7%) compared to compatibles (3.7%), while opposite picture is observed among the couples who are having both live birth and still birth. Chi square test (Table 1) does not reveal any significant difference between compatible and incompatible couples.

The average number of reproductive wastage per mating couple is found to be more among the incompatibles (mean-0.26) as compared to compatible couples (mean-0.17). The incidence of still birth is found to be more in compatible mating then incompatible mating type. Although the number of spontaneous abortion is equal in both the mating types but it is found to be higher in incompatible mating (mean: incompatible-0.09, compatible-0.06), when it is considered on the basis of per mating couples. The pregnancy wastage is more among incompatible couples as compared to compatible couples in studies reported by Chakravartti and Chakravartti (1978), Devi and Singh (2008), Soni and Mukherjee (2009). The present study does not show any statistical significant (Independent t-test) difference between ABO compatible and incompatible couples with reference to conception, live birth, still birth, spontaneous abortion and pregnancy wastage.

When fertility performance is seen with reference to all subtypes of incompatibility (A, B, AB-incompatibles) it is noticed that the average number of pregnancy, live birth and reproductive wastage per mating couple are found to be the highest in AB- incompatible (Table 3) mating

Table 1: Couples on the basis of ABO blood group compatibility and incompatibility

Mating type		*Couples who have*			*Couples who have*		
		Only LB	*Both LB+SB*	*Both LB+SA*	*Only LB*	*LB+SB+SA*	*Total*
Compatible	No.	46 (85.2)	6 (11.1)	2 (3.7)	46 (85.2)	8 (14.8)	54 (100.0)
Incompatible	No.	30 (85.7)	3 (8.6)	2 (5.7)	30 (85.7)	5 (14.3)	35 (100.0)
Total	No.	76 (85.4)	9 (10.1)	4 (4.5)	76 (85.4)	13 (14.6)	89 (100.0)
Chi- Square		Value-0.327, d.f.-2, Sig.-0.849			Value-0.005, d.f.-1, Sig.-0.945		

LB=Live Birth, SB=Still Birth, SA=Spontaneous Abortion, In bracket the figure shows percentage

Table 2 : Fertility performance according to ABO blood group compatibility and incompatibility

Mating type	*No. of couples*	*Mean or average*					
		Total conception	*Live birth*	*Still birth*	*Induced abortion*	*Spontaneous abortion*	*Reproductive wastage*
Compatible	54	4.70 (254****)	4.61 (249)	0.11 (6)	0.00 (0)	0.06 (3)	0.17 (9)
Incompatible	35	4.34 (152*)	4.11 (144)	0.09 (3)	0.09 (3)	0.09 (3)	0.26 (9)
Independent T-Test(d.f.-87)	t	0.662	0.960	0.384	1.692	0.419	0.866
	Sig.	**0.510**	**0.339**	**0.702**	**0.094**	**0.676**	**0.389**

****=4 Twin, *=1 Twin, In bracket the figure shows number of occurrence

Table 3: Fertility performance according to ABO blood group compatibility and subtypes of incompatibility

Mating type	*No. of couples*	*Mean or average*					
		Total conception	*Live birth*	*Still birth*	*Induced abortion*	*Spontaneous abortion*	*Reproductive wastage*
Compatible	54	4.70 (254****)	4.61 (249)	0.11 (6)	0.00 (0)	0.06 (3)	0.17 (9)
A Incompatible	14	4.43(62*)	4.21 (59)	0.07 (1)	0.14 (2)	0.07 (1)	0.29 (4)
B Incompatible	20	4.10(82)	3.90 (78)	0.05 (1)	0.05 (1)	0.10 (2)	0.20 (4)
AB Incompatible	1	8.00 (8)	7.00 (7)	1.00 (1)	0.00 (0)	0.00 (0)	1.00 (1)
ANOVA(d.f.-88)	F	0.924	0.855	3.449	1.425	0.100	1.162
	Sig.	**0.433**	**0.468**	**0.020**	**0.241**	**0.960**	**0.329**

NB: ****=4 Twin, *=1 Twin, In bracket the figure shows number of occurrence

Table 4: Fertility performance of compatible couples on the basis of ABO blood group combinations

*Mating type W*H*	*No. of couples*	*Mean or average*					
		Total conception	*Live birth*	*Still birth*	*Induced abortion*	*Spontaneous abortion*	*Reproductive wastage*
O*O	15	5.20 (78*)	5.07 (76)	0.20 (3)	-	-	0.20 (3)
A*O	7	5.14 (36*)	4.86 (34)	0.14 (1)	-	0.29 (2)	0.43 (3)
B*O	11	3.73 (41)	3.64 (40)	0.09 (1)	-	-	0.09 (1)
AB*O	3	5.33 (16)	5.00 (15)	-	-	0.33 (1)	0.33 (1)
A*A	7	4.57 (32)	4.57 (32)	-	-	-	-
B*B	6	5.83 (35**)	6.00 (36)	0.17 (1)	-	-	0.17 (1)
AB*A	4	3.50 (14)	3.50 (14)	-	-	-	-
AB*B	1	2.00 (2)	2.00 (2)	-	-	-	-
ANOVA (d.f.-53)	F	0.853	0.916	0.439	-	1.184	0.753
	Sig.	**0.550**	**0.503**	**0.873**	**-**	**0.330**	**0.629**

NB: *=1 Twin, **=2 Twin, In bracket the figure shows number of occurrence

type. Apart from those, average number of conception (4.43), live birth (4.21) and pregnancy wastage (0.29) per mating are more among A-incompatible couples. Average incidence of still birth (0.07) and spontaneous abortion (0.10) per couple are found to be more among the A-incompatible and B-incompatible couples respectively. Sharma and Kapoor (2004) mentioned that average number of live births per mating couple is slightly higher among the incompatibles as compared to compatibles. In the present study, average number of live births per mating couple is found to be the highest among the compatibles in comparison to all sub types of incompatibility, if the single case of AB incompatible mating type is excluded.

It is observed that in case of ABO compatible mating (blood group combinations), average number of pregnancy (5.83) and live birth (6.00) per mating couple are found to be the highest in B (wife) and B (husband) blood group combination (Table 4) but average number of reproductive wastage per couple is the highest (0.43) in A

Table 5: Fertility performance of incompatible couples on the basis of ABO blood group combinations

*Mating type W*H*	*No. of couples*	*Mean or average*					
		Total conception	*Live birth*	*Still birth*	*Induced abortion*	*Spontaneous abortion*	*Reproductive wastage*
O*A	10	4.80 (48*)	4.60 (46)	0.10 (1)	0.20 (2)	-	0.30 (3)
O*B	13	4.62 (60)	4.31 (56)	0.08 (1)	0.08 (1)	0.15 (2)	0.31 (4)
A*B	6	3.00 (18)	3.00 (18)	-	-	-	-
B*A	4	3.50 (14)	3.25 (13)	-	-	0.25 (1)	0.25 (1)
O*AB	1	8.00 (8)	7.00 (7)	1.00 (1)	-	-	1.00 (1)
A*AB	1	4.00 (4)	4.00 (4)	-	-	-	-
ANOVA	F	0.914	0.765	2.926	0.282	0.392	0.643
(d.f.-34)	**Sig.**	**0.486**	**0.582**	**0.029**	**0.919**	**0.850**	**0.669**

NB: *=1 Twin, In bracket the figure shows number of occurrence

(wife) and O (husband) blend. In case of ABO incompatible mating (Table 5), average number of conception (8.00), live birth (7.00) and reproductive wastage (1.00) per mating couple are found to be the highest in O (wife) and AB (husband) combination. It is found that the total numbers of pregnancy wastage are more (No.: e"3) among the couples of O (wife) and A (husband), O (wife) and B (husband), O (wife) and O (husband) and A (wife) and O (husband) blood group blend; while all other blood group combinations show single incidence of reproductive wastage. Soni and Mukherjee (2009) mentioned that the couple combinations having O type (wife) and A or B type (husband) showed maximum foetal loss. In the present study, the average number of live births per mating couple is found to be higher among the couples where both partners are having O blood group than those couples where neither partners belongs to O blood group (Wife*Husband: A*A, B*B, AB*A, AB*B, A*B, B*A, A*AB; No. of couple-29, No. of live birth-198, Mean live birth-4.10). Earlier findings indicated that the fertility rates of O fathers and O mothers were higher than those matings in which neither parents belongs to O (Satyanarayana et al. 1978).

CONCLUSION

The study discloses that mean pregnancy and mean live birth are more among the compatible couples while mean pregnancy wastage is found to be higher among the incompatible couples. Mean stillbirth is slightly higher among the compatibles but mean spontaneous abortion is more among the incompatibles. Among the subgroup of incompatibility total conception and live birth is lowest among the B-incompatibles while mean stillbirth and mean pregnancy wastage is more among the AB-incompatible couples. Mean spontaneous abortion is found to be higher among the B-incompatibles.

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